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Volume 236 MARCH 27, 1947 Number 13

THE MEANING OF THE PATIENT TO THE HOSPITAL*

IDA M. CANNON, D. HUM. (HON.)†

BOSTON

THOSE of us to whom the old Ether Dome and its furnishings are familiar, need little imagination to picture the scene just a hundred years ago today, when the first public demonstration of anesthesia for a major surgical operation took place. From all descriptions that I have seen, the focus of attention was on the great surgeon, in his frock coat, who dared accept responsibility for operating under untried conditions, on Morton, the dentist, who produced the mysterious stuff, or on the skeptics in the amphitheater. The atmosphere must have been charged as courage and determination met incredulity and suspended ridicule. What must have been the emotions of Gilbert Abbott, the patient, who participated so vitally in this adventure, which happily we can celebrate today? We know little of Gilbert Abbott besides the fact that he came to the hospital for treatment of a tumor of the jaw. But we can readily imagine him as a patient in the old Bulfinch ward and, on the fateful day, as being taken up the stairs to the operating room and placed on a plush operating table.

I suspect that Abbott, like most surgical patients since his time, experienced fear as he faced the oblivion of anesthesia. That he had courage we cannot question. His fortitude, like that of Dr. Warren, was a manifestation of character. But there was a difference, I believe, in the sources of their courage. Dr. Warren's bravery may well have been rooted in confidence in his own mature judgment and a willingness to risk ridicule for the sake of what success might mean to humanity in the future. The patient's courage, doubtless, was based on his faith in the surgeon who had cared for him and the hospital to which he had come for relief. Confidence of this order, which has been a large factor in making the Massachusetts General Hospital what it is today, is the greatest asset a hospital can have. It is not casually or easily earned. It is bred and maintained through consistent high quality of daily service. Responsibility for holding it rests with everyone who has contact with patients. If standards of service are lowered, the trust of the patients and the public is shaken and may wither away. Confidence in this hospital's devotion to the primary purpose of care of patients not only has been the chief source of patients but also has done much in making possible the maintenance of the other purposes — namely, teaching and clinical research. We in social service have as our special concern the meaning of sickness and hospital experience to the patient. This gives us an opportunity to see the hospital rather objectively in terms of the layman, who is the patient. It also lets us see something of what the patient means to the hospital. I propose to test this theme in terms of the threefold purpose of this hospital — care of patients, teaching and research — and to suggest how these purposes give relevance to the growing social responsibilities of this great institution.

The needs of the sick were the reason why the hospital came into existence. Such obvious facts have a way of becoming dulled as we live with them. It is well to refresh them occasionally by bringing them into the focus of attention. Vivid descriptions of the neglect of the sick, as presented by the Rev. Mr. Bartlett and Drs. Warren and Jackson, brought forth generous gifts that made possible the construction of the Bulfinch Building. The dire state of the sick inmates of the almshouse evidently gave good Mr. Bartlett, the chaplain, sleepless nights, for it was he who stirred the "number of respectable gentlemen" to join with Dr. Warren and Dr. Jackson in the historic appeal to Boston citizens that is found in Bowditch's history of the hospital. This volume, which is one of my treasured possessions, is a dull book. But for a social worker, a few of its four hundred and forty-two pages are of extraordinary interest. Perusal of the Warren–Jackson letter gives an illuminating picture of the social conditions of Boston in those days. We note, on the one hand, the "worthy" citizens who considered themselves, in their affluence, as "treasurers of

*Presented at a symposium, "The Hospital in the Community," held during the Ether Day Centenary of the Massachusetts General Hospital, Boston, October 16, 1946.

†Formerly, chief of Social Service, Massachusetts General Hospital.

God's bounty," with privileges of "indulgences in the true luxury of wealth, the pleasures of charity"—in contrast to the wretched poor in whose behalf the hospital was established. A hospital was frankly recognized as secondary to a good home for the care of the sick. But the insane presented difficulties even for a good home. In one of Mr. Bartlett's early letters, he writes of their plight in terms to suggest a tragedy that might befall anyone. Referring to his experience with insane patients, he writes, "Several persons of respectability seized suddenly and brought to the almshouse were put in cells. Among them Capt. Jones was put in a straight jacket." In those seafaring days this suggested a possible fate of our common humanity.

Again, in the Warren–Jackson letter, the housing conditions of the time are revealed. We read of the prospective patient who lived "in a garret or cellar, without light or due ventilation or open to the storms of inclement weather." There is no suggestion of a possible relation of social conditions and ill health. But we recognize an awakening of a humanitarian sense of responsibility for succoring those in trouble. Democracy was stirring, and from those beginnings, the hospital as a social institution has played an increasingly important role in our civilization. It has responded to the basic human needs more fully than any other of our institutions, since, with the growth and development of scientific medicine, the sick of all economic groups and in increasing numbers have turned to our hospitals for care.

The medical profession depends on lessons learned from the hard school of experience to improve its practice. I venture to say that this principle is not so truly characteristic of any other profession. Medicine, in its concern with questions of life and death, takes seriously the results of practice and builds up better methods as it looks frankly at success and failure.

Richard Cabot, in his early days as a clinic physician, confessed his failure to give adequate care to his patients. Scientific medicine as then organized and practiced in the outpatient department was lacking in many features essential for thorough examination and treatment. Dr. Cabot gives a vivid description of his morning in the clinic in his *Foregrounds and Backgrounds in the Care of the Sick*. With the true sense of the artist that he was, he protests that the clinical picture "will run into confusion and distortion" unless the physician "backs his foreground view with the vista of the distant, the past and the future, the background of the community out of which this individual has emerged and to which he belongs." Again, he writes: "Science without humanity becomes arid and finally discouraged. Humanity without science becomes scrappy and shallow." He puts these tests to himself as he faces the patient in his clinic:

> Am I seeing the actual facts, the ever-new and unique facts, the crying and immediate needs as they come before me? Am I tracing out as far and as deep as I can the full bearing, the true lesson, the unseen spirit of this moment, this situation, this calamity, this illness? . . . Am I using my eyes and ears, my sympathies and my imagination, as hard as I can? Am I searching for the deepest meaning, the widest bearing, the furthest connection of these facts?

Surely Dr. Cabot realized that such comprehension and understanding were impossible for anyone—certainly for the physician in the midst and under the pressures of a busy clinic — and that they could be approached only by teamwork of several specialists. But he threw a light on the still remote goal for all who participate in the care of patients. As a first step, the feeble beginnings of social service were initiated. The steady growth of this new adjunct of medicine is due to the soundness of Dr. Cabot's concept that this special service was essential to the patient's best care. We learned gradually what the profession of social work might contribute through close and disciplinary co-operation with scientifically trained men. And we learned much from the patients themselves. Richard Cabot became an ardent advocate of case teaching in medicine. As we know, he carried this over into his clinicopathological conferences, which were characterized by frank, eager discussion free from any hampering assumptions of infallibility, since the group, teachers and students, analyzed failure as well as success in diagnosis and treatment.

Our tuberculous patients have taught us much about our public-health responsibilities in the course of planning their care. Drs. Arthur Cabot and John Hawes, both of the Massachusetts General Hospital staff, were chairman and secretary of the first State Commission on Tuberculosis. When urging the building of the state sanatoriums, they called on us to appear at legislative hearings to describe the circumstances in which our tuberculous patients were having to be cared for at home, daily exposing other members of the family to infection. Similar testimony has been sought for the promotion of state care of patients with venereal disease and cancer.

Confidence of the patient has a significant bearing on the teaching function of the hospital. In my years of experience at the Massachusetts General Hospital, I have learned how closely related are good care of patients and good clinical teaching. It is a satisfaction to be able to assure, with conviction, prospective patients and anxious relatives that the very presence of medical students means that the teachers are holding the care of the sick at a high level. In making this statement it is fitting to pay tribute to the "amenities of ward rounds," as exemplified by Dr. Fred Shattuck, a great clinical teacher, and as expressed in word and deed by our Dr. Means. Here, surely, is a tradition to cherish.

The statement of the original threefold purpose of the Massachusetts General Hospital is brief and

simple. Yet how tremendous has been the elaboration of each of them — care of the patient, teaching and research — through these momentous years! The irreducible minimum in clinical relation characteristic of the early days, that between the patient and the doctor, was soon increased to include "the kind and discreet nurse." I suspect that even today some patients come to the hospital expecting just such simple professional relations in the course of their care. But how different is the reality! In the interest of better service, medicine has developed the complicated organization we now recognize as the modern hospital. Nursing, as well as medicine, has been elaborated and specialized. The rest of us — dietitians, medical social workers, occupational and physical therapists and laboratory technicians — present the patient with a most complicated environment just when simplification in human relations would be most welcome. How important it is that this complex organization should run smoothly! That patients submit and in turn seek the beneficence of the hospital is due, I believe, to their confidence that the staff with all its variety holds to the spirit of the primary purpose of the care of patients. The multiple teaching program of this hospital, where all these workers have their practical training, testifies to the acceptance of these supplementary services as essential to a high quality of medical care.

The patient is the foundation for clinical research. Many unknowingly have contributed to medical knowledge. And many patients, such as those in Ward 4, have consciously taken part in the advance of medicine. Captain Martell's glowing spirit has brought forth many eloquent expressions of appreciation for his generous and selfless offering of his obscure disease for a better understanding of diagnosis and operative procedure for parathyroid tumor. The hospital's annual report for 1932 gave a unique and eloquent tribute to the Captain. And Dr. Means has told his story in a recent issue of the *Harvard Alumni Bulletin*. Many hundreds of patients have served as nobly, since the more baffling and less understood symptoms have been earnestly studied in the course of treatment. Happily, out of these untold human dramas, has come much merciful help not only to the patients themselves but also to those who come later, for knowledge of the advances in medicine becomes widespread.

The hospital ward has always offered what might be called a social laboratory, which if comprehended could have given evidence of the neglected social ills of the community. Hospitals have come to play a role in this field only in recent years. I have an illustration of a neglected opportunity. A patient, Francis Choate, was admitted to our wards in July, 1851. The diagnosis was "necrosis of the jaw in a phosphorus worker." Sixty-one years later the record of this case was used to help promote the passage of the Esch Bill, prohibiting the use of white phosphorus in the manufacture of matches. This is how it happened. In 1909, John Andrews, secretary of the American Association for Labor Legislation, came to me to ask if I could help him find early cases of "phossy jaw," as it was called, which had long been known to be caused by exposure of workers to the processes of match manufacture. Mr. Andrews, working with Senator Esch, had collected evidence from 150 current cases of this disease. He wanted to strengthen his evidence by showing how long this disease had been known but neglected in the United States, whereas European countries had long since prohibited the use of white phosphorus in industry. As was our habit in such a search, I went to Mrs. Myers, who in a few hours produced Francis Choate's record. The following is an abstract from the history, as contained in the hospital record of 1851:

> [The patient] has worked for 14 years on phosphorus in manufacture of matches, dipping cards of matches into phosphorus. The room in which he worked would be filled with the fumes of it and he used to sit with his head over the vessel from which it came. He says not many can stand the work because of bronchial irritation which it excites. Usually shift workers. . . [The] teeth have dropped out. Half a dozen fistulous openings along the jaw. Masses of dead bone protrude into mouth from toothless jaw.

The patient was discharged on July 26 and advised to go to the country and return at a later date. He returned in November, and filed away in Treadwell vault is the final record, a vivid description of his wretched state, his death and the autopsy. Shortly before his death the record tells us, "he dozes over the fire," much to his comfort I trust. Little could he realize that many decades later his case, along with overwhelming current statistical evidence, would finally stop what the *Congressional Record* of 1912 designated as "one of the most loathsome diseases of our civilization." In that year, the use of white phosphorus in match manufacture was prohibited, and a patent of a harmless substitute was surrendered for cancellation. A method, safe and effective, was established for use by the men who work in the match industry.

In the early days of social service, a sixteen-year-old Russian-Jewish girl was referred to me, with a request that we arrange for payment for a back brace, to correct a lateral scoliosis. She had been working for over a year at a machine that called for repeated, frequent shifting of heavy levers from right to left. When this was reported to the orthopedist, his comment was "a perfect case of occupational scoliosis," and he urged her to change her job. This advice disturbed the patient, for her earnings in the daytime left her free to go to school in the evening. But she did change her job. The interest of the Child Labor Committee was enlisted, and the factory inspectors ordered that this machine be run by a male operator thereafter. All this was before the passage of the Industrial Accident Law and just before Dr. Edsall came to the hospital and de-

veloped the Industrial Clinic. David Edsall had a fine critical sense of the importance of clinical evidence. He encouraged analysis of the patient's work as a regular procedure in history taking as a means of bringing to light possible exposure to industrial poisons, special strains or adverse conditions that might affect the clinical picture. In this way, he often arrived at a more accurate diagnosis. He was also able, at times, with facts in hand, to demonstrate to industrial managers the evil effects of some of their processes on the human organism.

Hospitals have become, rather reluctantly, one of the best indexes of community health. I say reluctant, for I remember the resistance of the medical profession to comply, at first, with the public-health measures requiring reporting of diseases declared dangerous to public health. It required a major adjustment, since such reporting seemed to run contrary to the sacred tradition to hold information about patients inviolate. The potential patient became the object of preventive medicine and, as such, has drawn the hospital into his service on an ever broadening concept of responsibility. Psychiatry, through its deepening insights and understanding, is bringing to light the more subtle influences of our social and physical ill-health and our well-being.

Dr. Harvey Cushing, in his delightful address at the Centenary Celebration, paid tribute to a long line of doctors, nurses and employees who had created and maintained what he called the "personality of the hospital." We who have belonged to the Massachusetts General Hospital family know what he meant by that phrase. Intangible it is, and yet a reality to us. We sense certain characteristics of the Massachusetts General Hospital that have steadily carried on its traditions through the decades. The personality of this most human of institutions has been consistent but happily not static. It has matured through the years in constant interaction with the community to which it has devoted its beneficence. Clinical medicine and public-health programs are becoming more closely related as medical knowledge is more widely and practically applied. In this broadening sphere the hospital administrator has had to take and will increasingly have to assume leadership. But, as the full measure of social obligation of medical institutions is more clearly comprehended, we shall realize that responsibility rests on all of us — trustees, administrators, all the professional groups and personnel — and on the public to which we look for support. We shall build wisely if we remember that in the future as in the past our primary responsibility is to the patient for whom the hospital exists.

THE VOLUNTARY HOSPITAL — HOW CAN IT SURVIVE IN THE MODERN WORLD?*

NATHANIEL W. FAXON, M.D.†

BOSTON

IN 1811 the citizens of Boston, led by a minister, a physician and a surgeon, established the Massachusetts General Hospital. The McLean Hospital, for patients with mental diseases, was opened in 1818, and the hospital for medical and surgical illnesses in 1821. Thus was sickness divorced from poverty and crime, from the almshouse and the prison.

The first state hospital, the Worcester Lunatic Hospital, was not built until 1830, twelve years after McLean Hospital; the Boston City Hospital was opened in 1864, forty-three years after the Massachusetts General Hospital. Thus did private foresight, initiative and action precede political recognition. What happened in Massachusetts happened elsewhere in the United States. Private philanthropy and private agencies have almost universally pioneered in medical and social needs that, when demonstrated, have often but not always been accepted in whole or in part by government. Nonprofit or, as they are usually designated, "voluntary hospitals" have been the pacemakers that have set the standards and made the advances. In such hospitals lie our hope and our security.

A consideration of what has been accomplished in this institution alone is illuminating: the demonstration of ether as an anesthetic, a boon accepted but scarcely appreciated by you who gather here to celebrate the centenary of this epoch-making event; the discovery of the Y ligament and a new method for reduction of dislocation of the hip, by Dr. Bigelow; the recognition of appendicitis, leading to a rational and successful method of operative treatment, by Dr. Reginald Fitz; Shattuck's revolutionary treatment of typhoid fever; the establishment of Social Service, by Dr. Richard Cabot; the long fight of Amory Codman to awaken interest in and acceptance of end results and the true evaluation of the success of surgical or medical treatment; recognition of the importance of pathology through the erection of one of the first, if not the first, pathological buildings and the work therein of Dr.

*Presented at a symposium, "The Hospital in the Community," held during the Ether Centenary of the Massachusetts General Hospital, Boston, October 16, 1946.

†Director, Massachusetts General Hospital and Massachusetts Eye and Ear Infirmary.

James Homer Wright on blood platelets and actinomycosis and the development of his blood stain; the classic studies of Aub on lead poisoning, leading on to studies by Albright on calcium metabolism, obscure bone diseases and the action of hormones; Bauer's studies of arthritis; the work of Means and his associates on the thyroid gland; the initial use of liver therapy by Minot; Dr. Paul D. White's development of cardiology; and the calorimetric studies of Dr. Fritz B. Talbot. From the procession of skillful surgeons, it would be unfair to choose names, since all contributed something to the advance of aseptic surgery. It is justifiable, perhaps, to note the development of chest surgery by Robinson, Whittemore, Richardson and Churchill and of hip nailing by Smith-Petersen.

The Massachusetts General Hospital has trained over 1650 house pupils, house officers, interns and residents, who have carried the lessons learned here throughout the world and through four wars. Here was established the second school of nursing in the United States, with 3151 graduates forming the largest alumnae group of any nursing school. It was one of the first to provide accommodations for private patients and built the Baker Memorial, the first hospital for people of moderate means, on the basis of the principle of high-quality hospital care at cost and of medical care with limited fees. Thus, this hospital has pioneered in many fields. It has always placed the welfare and interest of the patient first and so has been quick to accept and adopt advances made in other fields. Its associations with Harvard University and the Massachusetts Institute of Technology have helped it to maintain an open mind and to retain a youthful spirit. It has surely developed what Harvey Cushing called the "soul of a hospital." It has been, and still is, all that a great hospital should be. It must and shall be preserved.

The survival of the voluntary hospital in the modern world is mentioned because, as Garrison states, "As we enter the machine age the salient fact about medicine is the trend toward socialization." This suggests increasing participation of government in hospital affairs. Much that follows can apply to all voluntary hospitals but especially to the small group of university-connected hospitals in which teaching and clinical and fundamental research, in addition to the care of patients, are carried on, of which the Massachusetts General Hospital is an example.

The problem of finances is primarily one of income, which is derived from two sources — annual gifts and payment for service rendered, either from patients as individuals or from organizations responsible for their care.

The anticipated deficits of voluntary hospitals, which were founded to provide care regardless of the ability of the patient to pay, have in the past been met through gifts and legacies from philanthropic citizens. This hospital has been particularly fortunate in its benefactors, and yet it is confronted with annual deficits that threaten to consume its accumulated capital. If it is true to its principles it cannot meet this need solely by raising charges to patients, since this would establish the precedent of making only the sick pay for the sick. Yet federal and state tax systems, through income and inheritance taxes, have seriously reduced the number of large individual gifts and legacies. How can they be replaced?

We are passing from a period in which the support of voluntary hospitals was considered to be the philanthropic duty solely of the well-to-do and rich to one in which it is believed that such institutions must be supported by their beneficiaries. Obviously, this means industry and labor, from a corporate standpoint, and employers and employees, from an individual standpoint. It is this conception that has produced so-called "community chests," which are built on the principle of supplementing the larger gifts of a relatively small group of citizens by many smaller donations from all classes. As corporate bodies receiving benefits, industrial concerns must support hospitals. Labor, through its unions, whose members also receive benefits, must now assume a similar share of responsibility. Likewise, as individuals, each worker and each member of management must make his contribution either to the hospital of his choice or to the community chest, from which it may be distributed to all hospitals in the community. If the voluntary hospital is to be retained it must be financially supported by its community.

We are proud of the generosity of Boston's citizens. We are proud of the accomplishments of the Greater Boston Community Fund, but the Fund has been woefully deficient in meeting the financial needs of the voluntary hospitals of Greater Boston. If it desires the continuation of these voluntary hospitals it must do more. The alternative is clear. Hospitals we must have for the care of the sick, for the teaching of doctors, nurses and others and for research. Shall it be a voluntary tax for the support of voluntary hospitals, or shall it be a federal tax for the support of governmental hospitals? In which way will the money go farthest?

A special group of industrial beneficiaries comprises the pharmaceutical manufacturers, which produce hospital supplies. Many are national in scope. The hospitals not only are the largest users of their products but also must be depended on as the laboratories in which new products are finally tested. The manufacturers should support hospital research, and their conception of research should be broad. Grants-in-aid should be made for specific problems, unrestricted gifts for general or fundamental research and, finally, grants for pharmaceutical research and free beds in recognition of the fact that the ultimate goal is the application of the result of the preliminary type of research to the patient. A drug may be

efficient in a test tube but may fail to cure a human being. Only in hospitals safeguarded and controlled by an efficient and watchful staff can the final test be made. Hospitals deserve the generous support of all pharmaceutical manufacturers.

So much for financial support through donations.

The second part of the financial problem consists in return for services rendered, which must be divided into services for which individuals are responsible and those for which governmental or other agencies are responsible.

It is generally agreed that private patients should pay cost or even a little more than cost and that semi-private patients should pay full cost. These classes can be dismissed from further consideration, since they create no financial problem.

Hospitals have traditionally set the ward rate and charged individual patients less than the cost of care. Thus, the present ward charge in this area is $6 a day for board, bed and general service — items that cost the hospital $8 a day. Extras such as x-ray films, operating room and laboratory fees, usually billed at cost, total approximately $3, making a daily cost to the hospital of about $11. Thus, full-pay individual ward patients contribute $9 for services costing $11. About 40 per cent do so. Another 30 per cent pay only a part of this cost, whereas the remaining 30 per cent are free patients.

There is at present a divided opinion regarding whether hospitals should continue their traditional policy of setting ward charges lower than cost or whether charge and cost should be synonymous. According to the first method all ward patients are benefited or are, in other words, the recipients of charity, but by the same token, the greater the number of patients cared for, the greater the financial strain on the hospital. There has therefore been a growing inclination on the part of hospital administrators to make charges equal cost, recognizing that fewer people will be able to pay ward charges in full and that larger allowances or remittances will have to be made. The gain would be that all would have a clear idea of what hospital care really costs. Gifts would still be needed to make up the difference between what ward patients would be able to pay and the charges that they would be asked to pay.

Another situation is created when a third party enters into the transaction — for example, the Department of Public Welfare, responsible for the care of an indigent patient, or an insurance company, responsible under the Workmen's Compensation Act for the hospital care of a patient who has met with an industrial accident. In each instance this third party has been made responsible by law, under certain conditions, for hospitalization. The hospital now deals financially with the third party, not with the patient. In itself there is nothing reprehensible in third-party contracts. The trouble occurs when such parties do not meet their financial responsibilities in full. The government has a way of legally accepting a responsibility and then passing part of the financial burden to hospitals. Agencies frequently profess to be willing to pay the rates charged to individual patients, but to date none has ever done so. There has always been a gap, even when the hospital charge was less than the cost. If charge and cost were synonymous, the discrepancy would be still greater.

During the past year the Massachusetts General Hospital has received patients from the following sources: state and local departments of welfare, responsible for the care of indigents, department beneficiaries under Old Age Assistance and Aid to Dependent Children Acts and those from the Division of the Care of the Blind and the Deaf; the Department of Correction — that is, from state reformatory schools and prisons; state and local departments of health, responsible for the care of patients with contagious disease, including selected cases of tuberculosis for operation and arthritic patients for study and treatment; the Massachusetts Department of Public Health, which is the local administrative body for the federal program for care of crippled children, the United States Public Health Service, which controls genitoinfectious diseases, the Emergency Maternity and Infant Care Program and the Vocational Rehabilitation Plan; and employees coming under the Workmen's Compensation Act, administered by the Industrial Accident Board. This is a formidable, although not complete, list of governmental agencies that, by law, must provide hospital care for their beneficiaries. Each decade sees the addition of new agencies so that the problem now under consideration is increasing.

The admission of patients coming under the jurisdiction of these agencies has resulted in the following financial situation. As pointed out above, it costs the Massachusetts General Hospital a total of $11 a day for each ward patient. Public welfare and other state agencies pay $5 a day, which means that the hospital is contributing more for the care of an indigent patient than the responsible governmental agency. In 1945 this cost to the hospital amounted to over $50,000. The Industrial Accident Board approves hospital charges to insurance companies at the rate of $4.75 a day, in addition to approximately $3 for extras, making a total of $7.75 a day, which means that the hospital is contributing $3.25 a day for each patient in this category. Yet this is supposed to be an insurance plan supported by industry and not intended to be a charity. In 1945 this cost to the hospital amounted to over $30,000. The Massachusetts Department of Public Health, administering the federal Program for Crippled Children, the Emergency Maternity and Infant Care Program and the Rehabilitation Program, pays $8 a day, so that here too, although to a lesser degree, the hospital contributes $3 a day to the care of patients supposedly provided for by a federal program.

No third party has yet paid in full all hospital costs, and the deficit has been met by the hospital from income from endowment, gifts of individuals and grants from the Greater Boston Community Chest. Certainly, the contribution of the Massachusetts General Hospital toward the care of patients for whom state and federal agencies are responsible and for cases under the Workmen's Compensation Act is over $100,000 a year.

What should be the relation of the hospital to these responsible agencies? The problem cannot be solved by a refusal to admit such patients. No hospital worthy of its name can refuse admission to patients in real need of treatment, with critical illness or following accidents, so that such patients will always be found in this hospital.

The argument that the hospital gets more for an indigent patient than it would if the patient alone was responsible and that for industrial accidents the Workmen's Compensation Act assures the hospital of some payment, whereas before the act was passed the hospital often got nothing, is a specious half truth. If government is responsible, should it not assume *full* responsibility? Should the hospitals subsidize industry and insurance companies? Regardless of what arrangements a hospital makes with individuals, using its own funds to make up deficits, should responsible governmental agencies likewise become beneficiaries of hospital charity? Should a situation be continued by which endowments given for "the care of the sick poor" or "for free beds" and donations to the Community Chest are used to defray expenses of the Department of Public Welfare or the Children's Bureau?

Thus, there are two conflicting ideologies. On the one hand, a hospital asks that government pay the full cost of care for any patient in any hospital, that cost to be determined according to acceptable governmental accounting formulas, on the basis that such a cost is a true reflection of the care given and received, and on the other hand there is the desire of government to obtain care at as low a cost as possible and as a final safeguard, the establishment of a ceiling payment rate, so that it can approximate a maximum budget for hospital care.

The present situation can scarcely endure. New groups are brought under governmental care every few years. Health-insurance legislation, such as that proposed by the Wagner–Murray–Dingell Bill, is before Congress. This would include practically all residents of the United States. It would authorize payment to hospitals of "not less than $3 nor more than $6 for each day for hospitalization not in excess of thirty days," for services that cost the Massachusetts General Hospital $11. Even if this hospital was granted the right to charge patients the difference between the Government payment of $6 and the cost of care, I doubt whether it could collect, because people would believe that the Government had promised them hospital care at no cost in return for the wage deductions for health insurance. How could hospitals provide a subsidy of such an amount on all patients?

There are three possible solutions: that hospitals continue to make up the difference between the cost of care and governmental payments, which, unless unexpected and unforeseen sources of income appear, is impossible; that hospitals provide less expensive and, therefore, presumably a lower grade of care for governmental beneficiaries — this is repugnant to physicians, hospital administrators and trustees, who have always striven to give medical care of the same quality, regardless of the patient's classification as ward, semi-private or private, the difference in hospital charge representing only a difference in luxury or privacy of hospital accommodations, and, moreover, an argument for the political demagogue is thus presented; and that the Government pay the full charge or cost of care. That the Government is beginning to recognize the justice of this last request is evidenced by the stand taken by certain federal agencies, but it has not been generally accepted by all agencies or by any state departments.

The high cost of hospital care is a frequent criticism of our hospital system, so that a word regarding costs is perhaps appropriate. The costs for each patient a day advanced from $1 in 1857 to $11 in 1945. During the same period, however, the current income per capita rose from $140 in 1857 to $1037 in 1943. This is nearly the same ratio of increase, so that although a patient had to pay eleven times as much for hospital care, he had a proportional increase in income with which to pay it.

Hospital costs vary to a considerable degree in different institutions. In the voluntary general hospitals of Boston the range is from $8 to $11. Costs are highest in teaching hospitals connected with medical schools. They must have extensive "readiness to serve" equipment, such as laboratories of all sorts, x-ray facilities and physical therapy. They must be prepared to receive patients at any hour, with operative personnel available if needed. They receive the most difficult cases. They develop and refine most of the advances in medical care, and pioneering is always expensive. Lastly, there is some expense, difficult to separate from operating costs, chargeable to teaching medical students, interns, residents, nurses, social workers, dietitians, technicians, physical therapists and others, and this is the hospital's contribution to education. Regardless of cost, it is essential that these groups be taught and given practical training. This can only be carried on in a teaching hospital.

On the other hand, hospitals, including teaching hospitals, have been notorious for paying salaries and wages below the level paid for similar work in industry. Longer hours of work are usually required. Hospitals have ever been frugal buyers. It is therefore fair to assume that whatever the cost, it is not

extravagant, that it represents in all instances full value received and that discrepancies in operative costs in various hospitals represent the difference in care demanded by the complexity of the cases treated.

The last problem deals with legislation. Voluntary hospitals should be concerned with the growing tendency of legislatures, including Congress, to consider hospitals in the same category as business and to include them in laws passed primarily to control industry. Hospitals should conform to many regulations, such as fire, building and sanitary laws, and should operate in many ways on business principles. But the demands of sickness, the conception of charity and the application of medical ethics make the operation of a hospital something more than a business.

One cannot operate on strictly business principles when one deliberately gives away something at less than cost. Legislation and regulations affecting hospitals should take this into consideration and should be separated from those regulating industry. Hospitals cannot survive a legislative program that, on the one hand, through the Minimum Wage Commission, increases wages and reduces hours of labor, and on the other, by statute or departmental regulations, prohibits governmental agencies from paying full costs for the care of their beneficiaries. Legislation that affects hospitals should be patterned for hospitals, not for industry.

* * *

What has been said at length can be summed up in a few words. The health and death rates of a community are in direct relation to the amount of money intelligently spent on sanitation, preventive medicine, the education of doctors and others engaged in the care of the sick and the support of medical schools and hospitals. If the people of Boston and the United States want good hospitals, they must pay for them. If they want voluntary hospitals, they must support them through individual gifts, through industrial donations, through the requirement that governmental agencies assume their obligations in full and through modification of legislation affecting them. Only in this way can the flower of our hospital system, the pacemaking voluntary hospital, be preserved.

THE POSSIBLE ROLE OF THE COMMUNITY HOSPITAL IN GRADUATE TRAINING IN SURGERY*

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AMERICAN medicine and surgery have made great strides since ether anesthesia was first employed in Boston a hundred years ago. Hospitals during this century have become more numerous and greatly improved, the present trend being toward caring for an ever-increasing proportion of the population. These hospitals have become one of the important institutions of almost every community throughout the country. The part that they will fulfill in the health of the Nation in the future, it seems, will be even greater. The possible role of the community hospital in surgical training is but one aspect of the question.

In presenting this subject for discussion, I shall elaborate briefly on the community hospital as a unit and on the distribution of hospitals over the country. The established standards of surgical training are reviewed, and the need for extending surgical training in the non-medical-center hospitals is stated. The possible role of the community hospital in this surgical training is based on the premise that better surgical care is desirable. A plan is suggested for surgical training in these hospitals that, it is believed, will contribute to that ultimate goal.

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The term "community hospital" is an elastic one. It may include the small hospital of a few beds at one extreme and the large city hospital of a thousand beds or more at the other. The hospital under discussion, however, is one in a town of 10,000 to 20,000 population and provides hospital care for 40,000 to 80,000 people within a radius of several miles. Such a hospital ordinarily has from 150 to 400 beds. It is an institution of first importance to everyone in the community and is operated by a lay and professional board representative of the people. A significant section of any hospital is the surgical service. The surgical therapy accorded the patients depends on the training and experience of the surgeon. Surgeons of the community hospitals should have breadth and firmness of foundation in their training because their responsibilities are great.

For a hundred and fifty years in this country surgical training was for the most part informal and vague. Over the past five decades various patterns that one might follow to become a surgeon have evolved. In the last twenty years these have become more distinct, with the result that surgical training has been defined and standards established by the American College of Surgeons and the American Board of Surgery. The American College of Surgeons[1] requires that candidates for member-

ship devote seven years after graduation from medical school to special training and limited practice. For those who graduated from medical school after January, 1938, a year must be spent as an intern in an acceptable hospital and at least two years as a resident, as a full-time surgical assistant to a qualified surgeon or in an apprenticeship of equivalent value. More recently, the American College of Surgeons has further increased the period of hospital training for candidates who graduated after January 1, 1944, to a minimum of four years of hospital service and graduate study in the basic sciences. More specific is the American Board of Surgery,[2] which requires that applicants, before they are permitted to stand a written, clinical and laboratory examination, spend a minimum of five years devoted to surgical training after completion of a year of internship.

According to the American Medical Association,[3] at the end of 1945 there were 6511 registered hospitals with a total bed capacity of 1,738,944, the actual utilization of beds being 10.6 per 1000 population. Hospital facilities are increasing both in proportion to the population and in actual numbers. The following figures are of significance[4]:

YEAR	BED CAPACITY
1930	1,000,000
1940	1,226,245
1945	1,738,944
1950	2,000,000 (estimated)

Of the 6511 registered hospitals, 4744 were general hospitals; 3066 of these had a capacity of 100 beds or less, 1148, a capacity of 100 to 300 beds, and 530, a capacity of 300 beds or more. The total capacity for the 4744 general hospitals was 922,549 beds. Of the 530 hospitals with a capacity of 300 beds or more, in which the average was about 1150 beds, less than 100 were in medical centers.[4]

In an attempt to determine the number of surgeons required in the future, it is necessary to consider the estimated increase in the total number of hospital beds that will be required during the next few years. From the figures cited above, it can be estimated that by 1950 there will be approximately 2,000,000 hospital beds. Indeed, this will create an increase in the number of surgeons that will be required. The Committee on Graduate Training of the American College of Surgeons[5] reported in 1939 that there were 6288 surgeons in the United States properly qualified and doing most of the surgery. In the same year, 231 hospitals were credited as having adequate facilities for training in surgery. These hospitals provided positions for 1234 surgeons in training. Also in the same year, 541 surgeons completed the training offered by these 231 hospitals, 145 having completed three years or more and 396 less than three years. It is evident, therefore, that only a limited number of this group would be eligible for examination by the American Board of Surgery or recognition by the American College of Surgeons. In 1945 the American College of Surgeons[6] reported that there were 249 hospitals in the United States and Canada conducting approved plans of graduate training in general surgery and the specialties. Two hundred and three of these were for general surgery. This information suggests that facilities for training in surgery had not kept pace with the increase in hospital beds. During the war years 1942–1945, however, surgical training was largely curtailed, and it may be expected that by 1950 there will be an increase in the facilities for training in surgery.

If 6300 surgeons were required to fulfill the needs of the country in 1939 and if the statistics are correct that 3 per cent of the total either die or retire from practice each year, it becomes apparent that a much larger number of completely trained surgeons will be required each year from now on. There must be not only replacements but also those to meet the increased demand because of the opening of new hospitals.

There are in the United States 69 approved medical schools, which for the most part man the best training hospitals and set the pace of hospital practice. The clinical sections of these medical schools contribute to the graduate training of the majority of men who are preparing to qualify for one of the boards. At present, the medical centers of the medical schools are the only hospitals that are properly equipped to provide for complete training in surgery including the basic sciences of anatomy, pathology and physiology.

These medical schools and their medical centers, however, are not adequate to provide training for the number of surgeons that are needed. They are specifically lacking in clinical facilities. And at the same time, in the non-medical-school hospitals, there is clinical material that could well be used for training purposes. The young physician who seeks training and has as his objective the requirements of the American Board of Surgery will find competition keen in the medical-school hospitals. If he turns to a nonacademic hospital his training is frequently less desirable because teaching facilities are lacking and in particular opportunities for work in anatomy, physiology and pathology are not available. Of course, some large hospitals compare favorably with those of the medical centers, but by and large this is not true for the majority of hospitals.

The trend to hospital practice and that toward a greater number of hospital beds indicate that there will be a demand for more physicians to be qualified as specialists by the boards. This is particularly true of surgery. If, as pointed out above, the medical schools are limited in the number of men they can train with their clinical facilities and if clinical facilities are available in the non-medical-school hospitals, it is logical to correlate the two so that the specialists that are needed may be trained.

The graduate training of the medical profession should be considered an important function of the medical schools, and indeed for the past fifty years in the United States they have become increasingly more active in this endeavor. With the requirements so clearly set forth by the various boards, it appears that the medical schools should interest themselves in the graduate training not only in their own hospitals but also in the hospitals within their community or sphere of influence. In some sections of the country, such as Boston and New York, there are several medical schools within a small geographical area. Would it not be a progressive step to enlist the aid of a medical school for a certain number of hospitals or for hospitals within a certain area? When I say aid, I do not mean that they would assume any control over the institution but rather that they would co-operate with the hospitals in the training of young doctors. These hospitals would request the medical school to review their facilities, to advise them on the problems presented by the training.

The medical school would offer the hospitals facilities for training or instruction in the basic sciences as required by the boards, staff members to participate in medical meetings held in the non-medical-school hospitals, a supply of partially trained young men and a stimulus for keeping abreast of current advances. The hospitals would provide the medical-school centers with additional opportunities for the men they had partially trained.

If full use were made of community hospitals with capacities of 150 beds or more whose annual admissions total 5000 to 6000 and over, there would be no lack of positions for training surgeons. A hospital of this capacity and larger that has been built, equipped and staffed to meet the basic requirements of the American College of Surgeons should lend itself to this purpose. I inquired directly of Dr. George H. Miller, director of educational activities of the American College of Surgeons, why these hospitals have not participated more in surgical training. His reply was as follows:

> The expression "community hospital" is used with reference to such a wide variety of hospitals that it is a little difficult to discuss it accurately with reference to graduate training. However, I might say that as we are accustomed to think of community hospitals, one of the major obstacles to their participation in graduate training, even in the case of those which are large enough to offer considerable clinical material, is their apparent inability to develop properly organized departments which will place responsibility for the quality of the work done within the department on a recognized department head or chief. They tend to set up a paper organization in which the department headship rotates more or less by courtesy annually, and the members of the staff do not think of the head of the department as having any real responsibility, and sometimes would actually resent any suggestion that the chief was responsible for the quality of any work other than his own. This, of course, does not make a situation in which we can approve the placing of a good resident for training. Many of them also lack in the staff men who have kept up with the recent scientific developments in surgery sufficiently to let them hold a departmental conference and discuss usefully the basic science interpretation of the clinical problems with which they are dealing.
>
> We are very much interested in encouraging the bringing of such hospitals as far as possible into the sphere of influence of the medical schools through affiliation or collaboration. However, the local problems, except for a few choice endowed community hospitals or strong suburban hospitals near a metropolitan area, prevent the inclusion of many hospitals, which, on the basis of their bed capacity and clinical material, would seem to offer opportunity for graduate training experience.

For hospitals that are large enough and have the facilities to participate in graduate training a general plan is needed. I should favor the division of the clinical work into the four sections of medicine, obstetrics, pediatrics and surgery, each headed by a clinical head on a part-time basis. The hospital of this type requires a full-time pathologist and radiologist. The surgical service is but a part of the hospital, although an important one. The chief, or clinical director, should be well trained, progressive and interested in teaching. He would be the surgical director responsible for the surgery done in the hospital. He and his senior staff should receive pay for the time devoted to teaching the junior staff, which should be composed of residents or fellows. The teaching program should be comprehensive and well planned, with the assistance of the medical-center group. It should include regular ward rounds, staff conferences of the department and general hospital conferences in the form of clinicopathological conferences. All activities in the hospital should be open.

Thus, in these hospitals, men in training would have excellent guidance in diagnosis, preoperative therapy, surgical procedures and postoperative care by the senior staff men. On them would rest the task of correlation of operative data, gross and microscopic pathology and collateral reading or study. Clinical conferences and ward rounds are essential to improvement in the care of patients as well as in the instruction of the trainee. There are many large hospitals in the country that have competent and well trained men who take excellent care of patients but who contribute little or nothing to the instruction of those in training. This is particularly true in municipal, county and private hospitals located in towns and cities without medical schools.

In some cities the medical-school hospitals, long established, have trained the majority of the physicians in the community. The instruction received is reflected in their practice. They are influenced by what goes on in the hospital they were trained in. If they are on the staff of that hospital or a similar one, the influence is greater. This force for advance is lacking in communities far removed from medical schools. This situation, I maintain, can be changed. The medical schools can and should extend their sphere of influence. The materials for this rest in the hospitals that already exist and those that are being established. The medical-center hospital and

the non-medical-center institution, by co-operation, can contribute a great step in the evolution of American medicine. Together, they can provide for the medical-school graduate an opportunity to fulfill the requirements of such boards as he may wish to qualify for.

The direct plan of training will not only provide an opportunity to develop but also create a relation between the physicians in the local hospitals and in the medical centers. Those from the former may attend meetings in the latter, using their additional library facilities and being afforded a channel for seeking aid in solving their more difficult clinical problems. Furthermore, the members of the staffs of the medical centers might be drawn on to speak on subjects of special interest. In turn, there would also be opportunities for those who had basic instruction in the centers to extend their training in the local hospitals and at the same time to become acquainted with practice. For it is indeed a difficult step from work in a large hospital to the actual practice of surgery in a community.

There is a strong trend for federal and state governments to assume control of hospitals, particularly in the building and maintenance of new hospitals. This is, of course, the product of a philosophy of government that seeks to regiment more and more the activities of its citizens. It includes the limitation of incomes and a so-called "redistribution of wealth." We may not as individuals agree with this program, but we are confronted with the problems it presents to the medical profession. One of these problems is financing the cost of training in the specialties. As you are doubtless aware, one of the most recent and far-reaching legislations, the Hospital Survey and Construction Act, was passed by the Seventy-ninth Congress of the United States and signed by the President during the early part of August, 1946.[7] The stated purpose of the act is to assist the states as follows:

> . . . to inventory the existing hospitals, to survey the need for construction of hospitals, and to develop programs for construction of such public and other non-profit hospitals as will, in conjunction with existing facilities, afford the necessary physical facilities for furnishing adequate hospital, clinic, and similar services to all their people; and . . . to construct public and other non-profit hospitals in accordance with such programs.

The emphasis in the building of the community hospitals has been on the physical plant and equipment. This is important, but more important is the hospital staff, which must be continually improved. The quality of the work done by a staff is dependent on the training of its members. At present, in many hospitals throughout the country, the surgery is done by men who were trained the hard way — by having a minimal amount of formal instruction. This method has produced many good surgeons and many poor ones. The community needs to contribute to the cost of the staff as well as to the building and its equipment. There is needed a subsidy for paying certain members of the senior staff for carrying out a training program, in addition to providing the surgeon in training a sufficient income so that he can maintain a social position equal to that of his peers in other professions, such as law and engineering.

He who embarks on a career of surgery is confronted with a long period of training after graduation from medical school. Heretofore, the surgeon after an equally long period of residency or apprenticeship with little or no income could expect and have over a short earning period compensation that would enable him to equal the income of his medical confreres by the time he had reached the age when he could no longer work. Thus, his family, although often an addition of his later life, had security and provision for education. Today, taxes and the trend of fees make the annual net income of the surgeon during his most active periods of practice so limited that he cannot set aside an appreciable saving that will compensate for the long lean years of preparation or provide for his old age. If medical-school graduates are to continue to embark on surgical careers with an eye to their immediate and future livelihood, they should receive a reasonable subsidy during this training period. The cost should be borne by the hospital, the community or the state. If incomes are to be limited, a subsidy should be available when long years of preparation are required. Surgery, more than other divisions of medicine, demands intensive and prolonged training. The past generation has seen those who are now its leaders of surgery struggle through such training. The merit of the system for a few is undeniable, but for the majority its applicability is questionable. Is it not time to initiate a plan that will serve a greater number?

The various insurance schemes for hospitalization have gained great popularity over the past few years, and the trend continues. These programs, in a period of economic prosperity, have been accompanied by a decrease in the number of patients seeking free beds. Many private hospitals dependent on endowment for support have had a reduction in income and an increase in operational expense. These hospitals have had to embrace the insurance plans so far as hospital care is concerned. Ward services have been curtailed, and clinical material for training purposes has been reduced. This is unfortunate because patients properly utilized are benefited when used for teaching purposes. The community hospital properly staffed could, it seems to me, evolve a plan whereby patients would be cared for by the senior and resident staff as they are in the larger teaching centers. Once the system is established in a community and the work is well done, it will have the support of those who use the hospital.

Surgeons of the community hospitals, as well as other members of the medical profession, need no

longer consider themselves isolated and in a position where their education cannot be continued. We have a comprehensive current medical literature, which should supplement an adequate medical library in the community hospital. And we have transportation facilities that should enable the profession to attend with ease county, state and even occasional national meetings where new material is presented. The radio and television, which have been used comparatively little for educational purposes of the medical profession, should be employed. Furthermore, by planning, staff members of the community hospital may have a few weeks every year or two during which they can engage in intensive study and observation of new methods as employed in the teaching centers. The United States today holds first place in medical progress; the medical profession, in one way or another, should be made aware of this fact, so that it may make the maximum use of the opportunity that exists. And, in particular, the opportunity should be most profitable for staff members of the community hospitals.

* * *

The development of surgery over the past hundred and sixty years in the United States has brought about the present standards established by the American College of Surgeons and the American Board of Surgery. These appear to be sound. If they can be adhered to, the quality of surgery in the future will be further improved. As indicated above, there are not enough positions in the hospitals that provide the facilities whereby these standards can be efficiently fulfilled. There are an adequate number of medical-school graduates each year who, after a year's internship, seek training in surgery, without success. If hospitals are to be staffed with board members in surgery, the non-medical-center and community hospitals must equip themselves with the facilities that will enable them to participate in the training of the surgeons who are needed.

In effect, it is proposed that the community hospitals become teaching institutions, that they be the medical centers of the community and that they accomplish this with the advisory assistance and co-operation of a university medical center. Such a plan should materially increase the number of properly trained surgeons that will be needed in the future; what is believed to be of even greater importance is that it will stimulate the physicians associated with these hospitals to keep abreast of advances and create channels through which new information can be easily circulated. Benefits that may accrue from this will be of greatest value to the citizens of the community in which these hospitals function. This appears to be a progressive step in medical care, but it is not a step that can be taken without the whole-hearted co-operation of those who are involved. It requires liberal financing by the community and the support of the medical profession in both the community and the university medical center.

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ARTHRITIS IN THE MEDITERRANEAN THEATER OF OPERATIONS*

III. Clinical Description of Infectious and Other Types of Arthritis

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IN ADDITION to the various types of joint disease described in the two previous papers,[1, 2] infectious and miscellaneous forms of arthritis were encountered among United States Army personnel in the Mediterranean Theater.

Arthritis Associated with Bacillary Dysentery

The arthritis associated with bacillary dysentery, although infrequently diagnosed, seemed of particular interest on account of an unusual symptom-complex that was encountered, especially in the region of Oran, Algeria, in the warmer months of 1943. This syndrome, which consisted in arthritis with conjunctivitis or urethritis, or both, and which has been mentioned in reports in the literature, has already been described by Lieutenant Colonel R. H. Young,[3] of the Twelfth General Hospital. A large part of the following material was thus derived from observations made at this hospital, although scattered reports of the type of arthritis under discussion, with or without this symptom-complex, were available from the records of other hospitals. Throughout this section, the term "dysenteric arthritis" is used purely for convenience, with the understanding that, as pointed out below, the Shigella infection may merely facilitate involvement of the joints and other structures by a secondary invader.

*The following material represents a condensation and a certain amount of revision of parts of a clinical monograph on arthritis prepared at the direction of the Surgeon, Mediterranean Theater of Operations, United States Army, and submitted to him in final form in June, 1945.

Incidence

The exact incidence of dysenteric arthritis is not known, either in the Theater as a whole or in the number of cases in which the diagnosis of bacillary dysentery was made. Arthritis has been encountered relatively often in some epidemics of dysentery and rarely or not at all in others.[4] For example, a search of the records of the Twelfth General Hospital revealed 20 probable cases of dysenteric arthritis among 173 cases of proved or probable bacillary dysentery — an incidence of 11.6 per cent. At the Seventy-third Station Hospital, on the other hand, the diagnosis of bacillary dysentery was made in 1120 cases during 1943 and 1944, without the recognition of a single case associated with arthritis. Figures in the literature have similarly varied from less than 1 per cent to 5 per cent and over.[4] Other hospitals in the Theater reported 21 cases of arthritis in association with bacillary dysentery, 10 of which showed conjunctivitis and urethritis in addition. The total number of cases was thus small, and the condition was chiefly confined to the Oran area. One can speculate also that, in a certain number of cases of acute arthritis, the association with dysentery was not recognized, since arthritis is known to occur in mild, easily overlooked cases of bacillary dysentery and even in the carrier state.[5]

Pathogenesis

That dysenteric arthritis is a metastatic infection, with organisms in and around the joints, has not been proved. In only a few recorded cases, in which cultures were taken in the field with opportunity for contamination, have dysentery bacilli been recovered from the synovial fluid.[4] Since blood cultures have uniformly been negative, an allergic or toxic mechanism has been proposed, and animal experimentation has demonstrated the possibility of either. Finally, as pointed out below in the discussion of Reiter's syndrome, a secondary invader rather than the Shigella group may actually be responsible for the arthritis associated with bacillary dysentery.

Diagnosis and Clinical Features

The diagnosis of dysenteric arthritis was established only on a presumptive basis in the Theater, depending on the finding of an acute arthritis and a history of preceding dysentery. In a certain number of cases, stool cultures and agglutination reactions served as confirmatory tests. In the differential diagnosis, other forms of acute infectious arthritis, especially gonococcal, rheumatoid in an acute stage and gouty arthritis, as well as rheumatic fever, were considered.

In the clinical description that follows, since the arthritis was uniformly the disabling factor, no distinction is made between cases with or without urethritis and conjunctivitis. The interval between the first symptoms of dysentery and the development of arthritis varied between a coincidental onset and seven weeks, with an average of sixteen and a half days. All the cases originated in the warmer months (June through October), the majority occurring in July and August. The arthritis usually arose acutely. Joints were severely inflamed, with effusion, and the course was severe and prolonged. Large joints, with the exception of the metatarsophalangeal, were involved oftener than small, the order of frequency being the knees (75 per cent of the cases), toes (especially the first metatarsophalangeal joint), ankles, shoulders, elbows and hands. In slightly over half the patients, there was bilateral involvement of at least one pair of corresponding joints. In common with other types of infectious arthritis, a few, rather than multiple, joints were affected, but monarticular arthritis was rare. In 9 out of the 20 cases, the arthritis was the only complication and was not accompanied by urethritis or conjunctivitis.

Ten patients also had urethritis, which usually followed the onset of the arthritis, but occasionally preceded it. Seven of these had conjunctivitis in addition. The urethritis was usually mild and sometimes not even noted by the patient until he was questioned. In contrast to the arthritis, it cleared readily without specific treatment. No patients were encountered with involvement of other parts of the genitourinary tract, or with balanitis or penile ulceration, as described elsewhere.[6] Ocular involvement, which occurred in 8 patients, consisted in a mild, bilateral, purulent conjunctivitis, with the exception of a patient with keratitis. All but one of these also had urethritis. The eye lesions cleared up readily, and no patient developed iritis, which was found in frequent association by Beiglböck.[6]

Laboratory findings were helpful only regarding cultures, agglutination tests and determinations of the sedimentation rate. The last was constantly elevated to a high degree during the acute stage of the arthritis, often reaching 100 mm. in an hour (Westergren method). Stool cultures were positive in 4 of 17 cases, with organisms identified as *Shigella paradysenteriae Y* in 3 and *S. dysenteriae* in 1. Agglutination reactions to the Shigella group were positive in a titer ranging between 1:80 and 1:640 in 8 patients. In a total of 16 patients on whom both tests were done, 11 had either a positive culture or agglutination reaction, or both. Cultures of urethral and conjunctival discharges and of the joint fluid in 1 case were negative. X-ray examination of the affected joints showed only varying degrees of bony atrophy, without destruction, even after several months.

Treatment and Course

Several of the patients had received sulfadiazine or sulfaguanidine, with a favorable effect on the dysentery, but the subsequent development of arthritis was not prevented. Once the arthritis was established, the same drugs were tried unsuccessfully in 8 patients. That the arthritis tended to be

severe and persistent has been mentioned, but 3 cases were mild and the patients recovered within a few days to three weeks and were returned to duty. Three others were evacuated for other causes, although the arthritis had entirely cleared. The remaining 14 were sent to the Zone of the Interior, with the arthritis slowly but definitely improving in about half. The course of these patients approximated that described in the literature, except that an ankylosing type of dysenteric arthritis,[4] with resultant permanent disability, was not seen.

Synovial Pathology

No reports on the pathologic histology of dysenteric arthritis have been discovered in the literature. One opportunity, however, presented itself to perform a synovial biopsy on a patient in the acute stage of an arthritis clinically compatible with this condition. The case history and pathologic findings were as follows:

A 31-year-old German prisoner of war was admitted to the Sixth General Hospital on May 29, 1945. He gave a history of an acute, febrile, at times bloody diarrhea from May 5 to May 27. A few days before the diarrhea had ceased, he had developed a painful swelling of the left knee and of the right 2 days later. Examination showed both knees to be moderately inflamed, with effusions — that on the left being more marked than that on the right. The temperature was 101.4°F. on admission, falling to normal in 3 days.

Examination of the blood disclosed a hemoglobin of 13.8 gm. per 100 cc. and a white-cell count of 10,600, with 77 per cent neutrophils. Examination of the urine, a blood Kahn test and two stool cultures were negative. Aspiration of the left knee on June 1 revealed cloudy, yellowish fluid, containing 4425 leukocytes per cubic millimeter, with a differential count of 60 per cent polymorphonuclear cells, 38 per cent lymphocytes and 2 per cent monocytes. An electrocardiogram was normal.

The patient improved steadily, with no medication except large doses of sodium salicylate. On discharge on June 17, examination showed only slight synovial thickening of the left knee and on the right a small effusion and slight limitation in flexion.

About 1 week after the onset of the arthritis in the joint, synovial biopsy of the right knee was performed by Major Otto E. Aufranc. At operation a large amount of pale, yellow fluid with a soft white clot was evacuated. The synovial membrane was slightly pink and edematous, and the small vessels injected. There was no pannus.

Microscopical examination of the biopsied tissue was done by Major Sedgwick Mead, who reported as follows:

> The tissue is edematous. Some of the blood vessels in the periarticular fat are ringed with round cells. The subsynovial vessels are dilated, and the cellular infiltrate is more pronounced in this layer. The synovial membrane itself is greatly thickened by the presence of a dense, homogeneous infiltration with large mononuclear cells, lymphocytes and, more rarely, polymorphonuclear cells. Occasional clumps of fibrin are seen, and the articular border is ragged, with nearly complete loss of synovial lining cells. Fibroblasts and new capillaries are growing in the synovial membrane.
>
> *Diagnosis*: synovitis, acute, severe.

Relation to Reiter's Syndrome

In 1916 Reiter,[7] a German physician, reported the case of a patient with the triad of arthritis, conjunctivitis and urethritis. He believed that the condition was nongonococcal and due to a spirillum that he had isolated from the blood stream. A number of papers have subsequently appeared in the German and Scandinavian literature describing a similar condition, but in no case has a spirillum been identified. The eponym, Reiter's disease, has persisted, although more descriptive terms have also been applied. Each author makes a distinction between this disease of unknown etiology and similar syndromes associated with gonorrhea and with bacillary dysentery. The first report on this subject in the English language[8] appeared in 1942 and was followed by one on renal complications in 1944.[9] All these cases were recognized at the Massachusetts General Hospital, where a series of 10 patients has now been collected. All the patients were men, usually young adults. The clinical manifestations, although often severe and including iritis and pyelonephritis, have thus far eventually cleared, with the exception of mild residual articular changes in certain cases. Recurrences, months to years later, however, have taken place. Extensive attempts to identify a bacterial or virus etiology have been unsuccessful. In February, 1945, Rosenblum[10] reported 10 cases of Reiter's syndrome in personnel of the United States Navy, 5 of which arose in the South Pacific and 5 in the United States. In 2 cases recurrences took place, and one patient with severe involvement of the finger joints showed cartilage destruction on x-ray examination. Another had a widespread, acute skin eruption resembling erythema multiforme. No reference is made in the article to an association with bacillary dysentery. In the same year, 11 cases in the Army were recorded, with diarrhea as the first symptom or accompanying the arthritis in 4.[11]

During the summer of 1944, of 2 patients with arthritis, conjunctivitis and urethritis admitted to the Sixth General Hospital, neither gave a history or evidence of dysentery or gonorrhea. One exhibited a shallow penile ulcer, which healed spontaneously after repeated negative dark-field examinations. This patient had received 800,000 units of penicillin without benefit. Another patient seen in August, 1943, was of especial interest. While awaiting evacuation for what seemed a typical infectious polyneuritis (Guillain–Barré syndrome), he developed urethritis, conjunctivitis and arthritis in rapid succession, without findings pointing toward dysentery or gonorrhea. In view of the reported incidence of polyneuritis,[12] presumably of toxic origin and secondary to bacillary dysentery, the possibility is raised of a common etiology for all the clinical manifestations of this patient.

A relation between the arthritis, urethritis and conjunctivitis following bacillary dysentery and Reiter's syndrome is immediately suggested from the essentially identical clinical pictures. It seems fair to assume that such an unusual symptom-complex probably arises from a single cause. Although, as pointed out above, Reiter's syndrome may be preceded by or associated with diarrhea, no evidence has yet been presented that an active or latent Shigella infection is responsible. A more logical explanation is that the dysentery merely

activates or provides a portal of entry for the etiologic agent of Reiter's syndrome and that postdysenteric arthritis is due to a secondary invader rather than to one of the Shigella group. This concept is supported by the facts that the organism causing bacillary dysentery has not been found in the joints in cases of arthritis associated with this disease, that the arthritis, unlike dysentery, does not respond to chemotherapy and that the histopathological findings in the case cited above with an acute arthritis following dysentery were typical of a severe case of Reiter's disease.

Gonococcal Arthritis

Incidence

Since the incidence of gonococcal arthritis in the Theater was difficult to determine, only a few representative samples and opinions are presented. A total of only 47 cases were reported by questionnaire from eleven general hospitals. This disease thus accounted for only a small part of the cases of arthritis seen in such installations. Similarly, low figures were estimated for station hospitals, even those handling a large number of patients with gonorrhea, the incidence being regarded as distinctly lower than that seen in the civilian population before the war. The proportion (2.5 per cent) of cases of gonococcal arthritis compared to the total number of patients with gonorrhea in the same general hospitals is surprisingly close to the civilian figure (2 or 3 per cent). This is explainable, of course, by the fact that the general-hospital admissions for gonorrhea were few and confined to cases resistant to therapy. In contrast, estimates as low as 0.2 per cent were received from hospitals primarily handling large numbers of gonorrheal patients.

In World War I a total of 7895 patients with gonococcal arthritis were admitted to United States Army hospitals — about 12 per cent of the arthritic patients, exclusive of those with rheumatic fever.[13] It seems highly likely that a much smaller number of cases were encountered in World War II. This difference was probably due to the specific therapy of gonorrhea with the sulfonamides and penicillin. A number of cases of arthritis occurred, however, after apparent penicillin cure of the urethritis, with an incidence in one station hospital of approximately 0.5 per cent.

Diagnosis

The diagnosis of gonococcal arthritis was made with great care in the Theater, in view of the regulations concerning line of duty and loss of pay that were in force until 1945. Although synovial-fluid cultures were not utilized as often as might seem desirable, the presence of gonorrhea was established bacteriologically, by culture if necessary in nearly every case so diagnosed. It was not generally recognized, however, that a patient might actually have rheumatoid arthritis that had been precipitated by a gonococcal infection of the genitourinary tract. Such patients undoubtedly made up a number of those considered to have gonococcal arthritis resistant to specific therapy.

Treatment and Results

The treatment of gonococcal arthritis in the Theater was not carried out according to a uniform plan. Sulfonamides, which had been found nearly constantly efficacious in civilian practice, were discarded in favor of penicillin when this agent became available. A trial of penicillin, however, yielded uncertain results, even with a continuous dosage of 200,000 units daily for a week or more. The apparent failure of this method was probably more frequently due to confusion between gonococcal arthritis and rheumatoid arthritis precipitated by gonorrhea than to the existence of gonococcal strains resistant to penicillin in the dosage used. At the same time, conflicting reports on the efficacy of penicillin therapy in gonococcal arthritis appeared in the literature.[14–22] In addition, although recent work has shown that an effective concentration in the synovial fluid is obtained with intramuscular penicillin,[23, 24] information to the contrary was available in the Theater.

From the considerations given above, sulfonamide therapy finally became the method of choice, with intra-articular penicillin in addition if possible. The largest series of cases encountered in the Theater was treated by Captain J. D. Phinney, who achieved the remarkably successful outcome of sending 28 out of 30 patients back to full duty. The patients were all given an initial dose of 3 gm. of sulfathiazole, followed by 1.5 gm. every six hours. Those with active gonorrhea or gonococcal conjunctivitis had in addition 200,000 to 400,000 units of penicillin intramuscularly at the rate of 25,000 units every three hours. If possible, an intra-articular injection of 10,000 to 25,000 units of penicillin was given daily for five or six days. One patient with bilateral ankle, knee and shoulder involvement received this treatment in each affected joint for nine days, with full recovery. Although synovial-fluid cultures were not performed, a large majority of patients in this series undoubtedly had gonococcal arthritis. In other reports of the use of a similar plan of treatment, the results were not uniformly favorable, again probably owing to a failure to recognize rheumatoid arthritis precipitated by gonorrhea.

Disposition

The dispositions in 47 cases collected from general hospitals were as follows: to duty, 17 (36 per cent); to limited service, 5 (11 per cent); and for evacuation, 25 (53 per cent). With the exception, then, of the series described above, the available results of treatment seem disappointing at first glance. In many of the cases that were considered failures, however, the patients were probably actually suffering from rheumatoid arthritis.

Meningococcal Arthritis

Meningococcal arthritis was generally associated with meningococcal meningitis. Only 9 cases were encountered, the incidence of this complication being 5.3 per cent in 170 patients with meningitis in general hospitals. This figure is in general agreement with civilian and military experience in the United States.[25–27] No essential difference was noted in the clinical features of the disease in these cases as compared with those observed in the United States or reported in the literature. Whereas the arthritis was occasionally found on admission, it was usually not recognized until four or five days had elapsed. The reasons for this apparent latent period are obscure. Early involvement of the joints probably takes place, but frank signs and symptoms of arthritis develop later or are not immediately noticed in an unresponsive patient in whom attention is directed toward the much more serious localization of the infection in the meninges.

As in the cases observed in the United States,[25, 28] prior administration of the sulfonamides or penicillin neither prevented nor lessened the incidence of arthritis. Although mild, transitory involvement of multiple joints might come first, the process eventually settled in one or a few large joints, chiefly the knee. Inflammatory signs were variable, and some joints were acutely swollen and painful at the onset. Since serum was not used in the Theater, no question of serum sickness arose, and only a few synovial-fluid cultures were performed, with negative results. The course of the arthritis was not strikingly influenced by chemotherapy or penicillin, although intra-articular injections of the latter were not tried. Important points that were sometimes neglected in the management of knee cases consisted in the avoidance of fixation, the postponement of weight bearing until the inflammation cleared and the early use of quadriceps exercises. The severity of the arthritis varied, but most of the patients required four to six weeks' convalescence before function was fully restored. All were returned to full duty, with the exception of 1 patient with mild residual changes in the knees, who was sent to limited service.

Meningococcemia without meningitis was reported in 26 cases, with one evacuation hospital furnishing 5 cases.[29] This condition was often accompanied by pain in the region of the joints — sometimes caused by embolic skin lesions — and occasionally by a frank arthritis. The cases were often confused at first with rheumatic fever or erythema nodosum, the diagnosis usually being made finally on the basis of the typical picture,[29] although a few positive blood cultures were obtained. Cure and rapid return to full duty were accomplished in every case with the aid of chemotherapy, usually sulfadiazine.

Gouty Arthritis

This form of arthritis was carefully looked for in the hospitals in the theater, but only 15 cases were reported. In World War I, a total of 82 such cases were admitted to Army hospitals.[13] In some cases in the Mediterranean Theater, the diagnosis was made on equivocal blood uric acid findings, without a characteristic clinical picture. A lack of colchicine prevented treatment of acute attacks and possibly, in certain cases, return to duty. Ten patients were considered unable to perform any sort of duty in the Theater and were evacuated. The remainder, chiefly officers with sedentary assignments, were able to resume their duties.

Miscellaneous Types

Only 3 cases of tuberculous arthritis were reported from general hospitals in the Theater. The incidence in World War I was similarly low, a total of 188 patients being admitted to Army hospitals.[13] In 2 cases, in which a knee and a hip were respectively involved, the diagnosis was obvious, but in another, a second biopsy of the ankle joint was required for an unquestioned diagnosis. All the patients were evacuated to the Zone of the Interior.

A diagnosis of undulant fever was made in 34 patients in general hospitals, a number of whom presented articular symptoms. None of these cases were confused with any type of arthritis except for one patient with multiple joint involvement, another with a suppurative knee requiring drainage and a third with osteitis of the spine.

Scarlet fever was rarely accompanied or followed by arthritis, but a few patients manifested a recrudescence of rheumatic fever, and two others a transitory arthritis.

A patient with a staphylococcal infection of the wrist of unknown origin, which was surgically drained, was the only one reported with a septic joint not associated with trauma.

Patients with certain infectious diseases presented themselves with skeletal aches and pains at the onset. Most conspicuous among such symptoms were the arthralgia occasionally noted in acute hepatitis, the severe pain and stiffness in the cervical region of sandfly fever and the exquisite tenderness resulting from the muscular localization in Weil's disease.

No case was observed in which arthritis could be attributed to amebic dysentery, malaria, granuloma inguinale or coccidioidomycosis. There were 3 cases of arthritis associated with lymphogranuloma venereum, but details were not available regarding the probable relation of the arthritis to this venereal disease. Acute disseminated lupus erythematosus, a rare disease and one that is much more frequent in women than in men, was diagnosed at least twice, but there were no articular symptoms that might have caused confusion. One patient with a joint condition resembling rheumatoid arthritis was suspected of but not proved to have periarteritis nodosa. The most recently described syndrome among the arthritides, palindromic rheuma-

tism,[30] was diagnosed twice at the Three Hundredth General Hospital.

Suggestions for Improvement in Treatment

Segregation of patients with arthritis in special hospitals or dispensaries is unnecessary in an overseas theater, but more efficient handling of such cases seems possible within the existing medical installations.

Provision should be made in the forward areas for rapid examination and disposition of patients with articular symptoms to avoid the sending of large numbers to base hospitals. For officer personnel, an internist with interest in and some special knowledge of joint disease, an orthopedist and a psychiatrist should constitute a team. Laboratory requirements could be held at a minimum, but x-ray examination would be necessary, especially in patients with back symptoms. Many of the patients with arthralgia or psychogenic rheumatism could thus be sent back to duty after a relatively short period of examination and treatment, and those with a real arthritis or doubtful cases evacuated to base hospitals.

In general and station hospitals, one officer, preferably on the medical service, should be given the arthritic diseases as an assignment. Although he should be experienced and interested in arthritis, it would be his duty to perfect his knowledge of the subject in every way possible. He should see all cases of joint disease in consultation and thus constantly teach himself as well as the other ward officers. Cases of especial interest or difficulty could be transferred to his own wards. He should be responsible for the policies followed in the hospital for diagnosis, treatment and disposition of patients with arthritis and should personally handle such curable conditions as gonococcal arthritis. He should work in close co-operation with orthopedic and neuropsychiatric officers and with the laboratory and x-ray services. In this way, the problem of arthritis in fixed hospitals in an overseas theater could be handled to greater advantage, with a consequent reduction in hospitalization and manpower loss.

Summary

Arthritis associated with bacillary dysentery was rarely diagnosed in the Theater, except in the Oran, Algeria, area during the summer of 1943. In many of these cases, urethritis and conjunctivitis were present, with a clinical picture closely resembling Reiter's syndrome. Evidence is presented that the Shigella infection merely facilitates involvement of the joints and other structures by a secondary invader.

The incidence of gonococcal arthritis was less than that found in prewar civilian practice, probably owing to early, specific treatment of gonorrhea. Cases were recorded, however, after apparent cure of the urethritis with penicillin. The explanation of the unsatisfactory results of therapy probably lies in the failure to recognize rheumatoid arthritis precipitated by a gonococcal infection.

Suggestions are made for the more efficient handling of joint disease in an overseas theater.

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MEDICAL PROGRESS

DIABETES MELLITUS

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BOSTON

THE most notable achievement in diabetes mellitus during 1946 I consider to be the demonstration by Lukens and Dohan,[1] of the Cox Metabolic Unit, University of Philadelphia, of a fourth method by which the disease can be caused experimentally in animals. They accomplished this by the production of hyperglycemia in a cat for a period of two weeks. It will be remembered that Haist, Campbell and Best[2] showed that by the simultaneous administration of insulin, diabetes can be prevented in a dog receiving injections of anterior pituitary extract and that Lukens and Dohan[3, 4] prevented and "cured" the diabetes in a cat following injections of pituitary extract by overcoming the subsequent hyperglycemia and maintaining the blood sugar at a normal level by means of insulin, diet or phlorhizin. It is known that in animals in which a subtotal pancreatectomy has been performed, just as after injections of anterior pituitary extract, a period of hyperglycemia precedes hydropic degeneration. On the theory that if the prevention or lowering of hyperglycemia is useful its causation should be harmful, Lukens and Dohan, by intraperitoneal administration of glucose, induced hyperglycemia in cats, and after two weeks in an animal in which this condition prevailed they found diabetes accompanied by changes in the islands of Langerhans, including hydropic degeneration. Technically this is a notable achievement, as attested to me by Dr. F. M. Allen, because of the difficulties generally encountered with experiments on this animal. Lukens and Dohan write as follows:

> In summary, hydropic degeneration of the islands of Langerhans and permanent severe diabetes mellitus have followed the prolonged injection of intraperitoneal glucose-saline solution in normal as well as in partially depancreatized cats. Positive results were associated with prolonged hyperglycemia. These findings add further evidence in support of the hypothesis that a sustained elevation of blood glucose may, under certain conditions, lead to the production of damage to the islands of Langerhans in this species.

The importance of hyperglycemia in the etiology and treatment of diabetes is emphasized by Ricketts,[5] of the University of Chicago, who marshals the evidence on this topic in so masterful a way that his study should be "must" reading for every medical student as an ideal presentation of the subject and for each doctor interested in diabetes because of its assembly of facts regarding the disease.

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Naturally, to those who believe heart and soul in the aggressive treatment of diabetes advocated by Naunyn, these papers are welcome. They fortify the thesis that control of the disease pays and confirm the opinions of Joslin et al.,[6] as well as helping to explain why the patients who closely follow this dictum are the ones freest of complications.

An example of such patients is afforded by a man (Case 2419) who developed the severe diabetes of childhood at the age of fourteen and a half years in 1920. For about ten years he had as skilled a diabetic nurse as I know. He meticulously followed the orthodox treatment of a low-carbohydrate, low-calorie diet, in addition to insulin and exercise, and the nurse even accompanied him when he piloted his own aeroplane on week-end trips. At twenty-six years of age he married a nondiabetic girl from a nondiabetic family, who in preparation spent nearly six months learning the principles of diabetes control in the house of the patient's mother. They now have three healthy children. A few months ago in a train wreck he sustained ten broken ribs, a punctured lung, a fourfold fracture of the scapula and a compound fracture of the wrist, and yet at the end of four weeks, on discharge from the hospital, he was told by his surgeon that his recovery had been as rapid as that of a nondiabetic person. The diet included 175-200 gm. of carbohydrate, 60-75 gm. of protein, 90-100 gm. of fat, and 18 units of crystalline and 70 units of protamine zinc insulin daily.

Another patient (Case 2568) developed diabetes at the age of seven years and nine months. She followed a strict regime of fasting and was one of the first to take insulin in this country, under the supervision of Dr. F. M. Allen. After twenty-five years of diabetes a third healthy baby was delivered — a triumph for the patient's courage and the combined skill of Drs. Priscilla White, Raymond Titus and Warren Sisson.

STATISTICS

In 1942 Gate[7] published a careful study, unfortunately overlooked, of a group of 1800 patients with examinations of the urine and blood with the purpose of identifying those who had diabetes or might develop it and of prolonging the lives of the former and possibly postponing or preventing the full development of the disease in the latter. For this survey Dr. Gate utilized the employees of a large manufacturing concern on whom yearly

urinary analyses, physical examinations, x-ray studies and blood Wassermann tests had been made. Of this group he studied in detail three sections — those with a family history of diabetes, those with a hereditary history of diabetes and those who had shown sugar in the urine. He writes, "What a wonderful work in preventive medicine it would be if we could identify all the persons having diabetes and potential cases of diabetes in the United States."

Table 1. *Incidence of Diabetes.*

Age	National Health Survey		Gate Survey		
	Males	Females	No. of subjects	Diabetic patients	
				no.	per 1000
yr.	per 1000	per 1000			
15-24	0.02	0.57	245	1	4.0
25-34	0.50	1.08	604	4	6.66
35-44	2.01	3.16	540	6	12.0
45-54	4.49	8.64	316	7	18.0
55-64	9.96	18.20	89	1	11.0
65 and over	14.58	21.47	7	1	120.0

For diagnostic purposes Gate employed in blood sugar determinations the Myers–Bailey modification of the Lewis–Benedict method. Venous blood samples were used. The following is an account of Gate's findings:

> The starvation blood sugar should be 0.14 per cent or more and the post-prandial should be 0.22 per cent. The blood sugar should not fall so low as the starvation sugar at the end of two hours, and there must be accompanying glycosuria.
>
> We have classified potential cases of diabetes as follows: Those whose starvation blood sugars were under 140 milligrams, whose peak did not rise to 220 milligrams, whose two-hour blood sugar did not fall to 140 milligrams, but may have nearly approached it, and who have accompanying glycosuria. The higher limits of blood sugar have been used because the blood sugars usually run higher with this method of determination.
>
> We have done glucose tolerance tests on 109 individuals. Seventy of these individuals had given a history of having some relative who had diabetes, 43 had shown sugar in the urine, and four had shown sugar in the urine and also had given a positive history.
>
> Realizing that the glucose tolerance test may be inaccurate if the individual has been restricting his diet, no tests were done on persons who had been restricting their diet in any way. The glucose tolerance test, which we used, was as follows:
>
> Each individual reported in the morning without breakfast and having had no food for approximately sixteen hours. A sample of venous blood was obtained and a specimen of urine; 100 grams of glucose in solution was given orally and samples of blood and urine were tested at one-half-hour, one-hour, two-hour, and three-hour intervals.

In Table 1 the incidence of diabetes found by Dr. Gate is compared with that obtained by a house-to-house canvass conducted by the National Institute of Health.[8] (A personal communication from Dr. Gate disclosed that 159 of his 1800 subjects were females.) Instead of an average incidence of 1:200, as would be expected from the National Health Survey, Gate found a total of 20 diabetic patients, or 1:90.

Glucose-tolerance tests were performed in the 8 cases with a family history of diabetes, in 63 with a hereditary history and in the 46 in which examination showed sugar in the urine. Eight patients were known to have diabetes, and in 8 with family histories of the disease the tests revealed no diabetes; 9 of the 63 with a hereditary history showed diabetes, and 11 of the 46 with sugar in the urine were so classified, but 8 of these had previously been known to have the disease. One case with a family history, 8 with a hereditary history and 10 with sugar in the urine, but without history, were classified as potential cases. Gate concluded that the incidence in this particular group was about twice what might be expected as compared with published estimates.

Gate observed a great deal of interest among the persons interviewed while this work was in progress. Many of those who had a familial history of diabetes or near relatives with diabetes had apparently been wondering whether or not they would develop the disease. Some had been assured by their physicians that they need not worry; others were extremely interested in having the glucose-tolerance test performed.

No difference in the incidence of diabetes was observed between subjects working in the office and laboratory and those who did varying types of operation and labor in the plant itself. The study concludes as follows:

> Further investigation along similar lines in other groups even without glucose tolerance tests, but with random blood sugars, would yield very valuable information, and unquestionably would uncover many hitherto unrecognized diabetics.
>
> The greatest benefit resulting from this investigation is not that we may have shown that the actual incidence of diabetes is higher than has been estimated previously. The real value is that we have found a number of individuals who did not know they had the disease and who now will be able to prolong their lives. Then, too, a goodly percentage of those who are potential cases may be able to avoid the disease because they have been forewarned of the danger.

Diabetes in Bergen

A notable article of the year is that by Hanssen,[9] who was senior assistant in the medical department of the City Hospital of Bergen, Norway, between 1940 and 1943, having previously worked in Denmark under Hagedorn. His monograph includes a study of the morbidity, mortality, causes of death and complications of diabetes mellitus in Bergen from 1925 to 1941. The investigation was so thorough that no similar research of just this type is apt to be attempted soon, and in fact, I think that all of us should concentrate more and more on the study and care of present-day cases. The monograph not only covers data relating to the diabetic patients in Bergen but also includes the literature in both Europe and America, and in it will be found many valuable citations sometimes overlooked in this country.

Bergen's population was about 100,000, of whom 45 per cent were males. Since there is little migration of the inhabitants in Norway it was easy to trace the diabetic patients. There were few Jews.

In general, the diet was low in calories and carbohydrate but relatively high in fats. Insulin was used in moderate amounts, being available for all and protamine zinc insulin having been employed since 1936. There were 392 deaths from diabetes between 1925 and 1941 and 402 known living diabetic patients in October, 1941, making a total of 794 cases. These figures were obtained from death certificates, cases treated in the City Hospital, patients listed for supplementary food rations and the complete replies received from questionnaires sent to physicians.

Particular attention was paid to arteriosclerosis, examination of the heart, the vessels in the right leg and the eyes, as well as electrocardiograms, being utilized.

The ratio of the 402 diabetic patients to the general population in Bergen in 1941 was 3.2 per 1000 males and 4.3 per 1000 females, the average being 3.8 per 1000, of whom 43 per cent received insulin. For a comparison, in Oslo the incidence — on the basis of patients receiving supplementary rations on July 1, 1943 — was 4.3 per 1000, of whom 54 per cent were receiving insulin. The author cites Falta as giving the incidence of diabetic patients in Vienna in 1940 as 5 per 1000 population.

The age at onset of the disease is placed at a decade later in life (sixty to sixty-four years) in Bergen than in the United States. Of the total of 794 cases there were only 29 with onset under the age of fifteen years, or about half the percentage in the Joslin series.

Just as Lombard and Joslin[10] noted the unreliability of computing morbidity rates from mortality figures, Lundberg, cited by Hanssen, wrote in 1938, "It is probable the time will soon come when it will be quite impossible to employ the mortality figures for estimating the frequency of diabetes in the population." As a matter of fact, in Bergen from 1925 to 1941, only 58 per cent of the male and 68 per cent of the female diabetic patients were registered as having died of the disease. These figures are similar to those of 62.9 and 64.3 per cent for Massachusetts in 1936 and 1946 found by Lombard and Joslin and that of 69.4 per cent observed by Palmer[11] in Seattle.

Of the 392 deaths in Hanssen's study, 125 occurred in the City Hospital, and of these, 108 cases were autopsied. Table 2 presents the causes of death in the Joslin[12] group of cases as compared with those in the Hanssen monograph.

The treatment of diabetic coma in Hanssen's group was similar to that employed in the George F. Baker Clinic, glucose and alkalies being omitted. The predominant cause of the high case mortality was the delay of treatment.

Under fifty years of age hypertonia was exceptional. Above that age both systolic and diastolic hypertonias were frequent, 43 per cent of the male and 68 per cent of the female patients with blood pressures of over 160 systolic, 100 diastolic, as compared with 25 per cent of the normal men and 36 per cent of the normal women of the same age group. Blood pressures over 201 systolic, 121 diastolic, were observed in 10 per cent of male and 23 per cent of female patients. Hanssen notes that elderly people tend to have a high systolic but not a high diastolic pressure. He observed that diabetic retinitis was particularly frequent in diabetic women.

TABLE 2. *Causes of Death among Diabetic Patients in the Series of Hanssen[9] and Joslin.[12]*

CAUSE OF DEATH*	HANSSEN SERIES (1922–1936) PERCENTAGE	HANSSEN SERIES (1925–1941) PERCENTAGE	JOSLIN SERIES (1937–1943) PERCENTAGE	JOSLIN SERIES (1944–1946) PERCENTAGE
Diabetic coma	8.4	8.2	3.4	3.1
Arteriosclerosis ...	53.8	48.0	64.0	66.6
Infection	13.6	22.0	11.5	7.8
Tuberculosis	4.2	4.1	2.6	2.5
Cancer.....	8.8	8.6	8.8	8.9

*There were 392 deaths in Hanssen's series. In the Joslin series the total deaths were, respectively, 2583 and 651 in the periods 1937–1943 and 1941–1946.

Arteriosclerosis was observed more frequently at autopsy in the Bergen series than in that of Warren[13] presumably because 84.5 per cent of patients in the former were over fifty years of age in contrast to 67.5 per cent of those in the latter. On the other hand, coronary occlusion occurred in only 6 per cent of cases in the Bergen series, in contrast to 20 per cent in that of Warren. The heart weights were greater in the Bergen series, but the patients were older and comparative body weights were unknown.

Comparisons of the incidence of arteriosclerosis in different communities are open to serious criticism, and Hanssen cites Björnssen's[14] observations regarding this problem in Iceland, Copenhagen and Vienna. Local factors, sex, occupation, environment (town or country) and peculiar or different hospital conditions may have been of great significance. General impressions, unsupported by an actual analysis of available material, are not conclusive, clinical investigations are not sufficiently accurate, and even pathological and anatomical data really depend on the subjectivity of the pathologist.

Roentgenologic examinations of the arteries of the leg were carried out on 451 diabetic patients in a search for calcification.* Calcification was rare under the age of forty years but increased with the patient's age, being found above forty years of age in 56 per cent of the men and in only 37 per cent of the women in the same age group despite the greater frequency of systolic and diastolic hypertonia in the female patients. Extensive calcification, however, was more frequent among female diabetic patients than among the nondiabetic women ex-

*Studies of the pelvic arteries were not made. During the last five years Dr. Priscilla White[15] has found that when the pelvic arteries are visualized in a pregnant woman, the prognosis for a living child is definitely less favorable than otherwise. Thus, many of these patients abort, and only 20 per cent have had a living child, regardless of whether or not they are treated with hormones. Dr. White considers x-ray examination of the pelvic arteries to be of the greatest importance.

amined. No relation was detected between the duration of the diabetes and the frequency of calcification or with high serum cholesterol figures (not less than 220 mg. per 100 cc.). No great difference in the incidence of arteriosclerosis as shown by the roentgenogram was found between male diabetic patients over forty years of age (56 per cent) and nondiabetic patients with diseases of the heart, kidneys and blood vessels (67 per cent) or from another group without such diseases (50 per cent). For women the incidence was definitely higher in the first two groups (37 and 33 per cent) than among those in the third and younger group (13 per cent). Therefore, the high frequency of arteriosclerosis on roentgenologic examination of diabetic patients demonstrated by Joslin and his associates is not confirmed.

TABLE 3. *Lesions Discovered at Autopsy in 429 Cases of Diabetes.*

LESION	CAUSE OF DEATH NO. OF CASES	COMPLICATION NO. OF CASES
Coronary sclerosis	6	137
Coronary occlusion with infarction	87	26
Myocardial failure	18	68

Some of the patients with demonstrable arteriosclerosis showed signs of a defective arterial blood supply to the lower limbs, but no connection between these phenomena was demonstrable.* The reduction of the arterial blood supply to the lower limbs was first and foremost due to thickening of the intima that is not demonstrable on ordinary x-ray examination. This is also why the demonstration of such arteriosclerosis is of no special prognostic significance in any given case, diabetic or otherwise.

Among Hanssen's 292 diabetic patients whose deaths were due to known causes, the deaths from heart disease were attributed to arteriosclerosis and hypertonia in 15 per cent of the male and 16 per cent of the female patients. Among the 108 diabetic patients examined post mortem were 9 who died of heart disease, which in 5 cases consisted of infarct of the heart and in 4 of heart failure. In contrast, 44.5 per cent of cases in the Joslin series of 651 deaths, outside and in the hospital, from January 1, 1944, to May 15, 1946, were cardiac deaths,[12] but it should be pointed out that this series is at a distinctly later period. Among 429 deaths at autopsy at the George F. Baker Clinic, 111, or 26 per cent, were due to heart disease, the percentage having risen from 22 in 1940.[16] Table 3 presents the types of lesion discovered at autopsy in the most recent Warren–Joslin group of 429 cases. Again, the longer duration of the diabetes, especially in patients dying under fifty years of age, and the increasing age of these relatively young patients at death are considered factors that distinguish this group from those in the Norwegian study. Hanssen cites Wilder as emphasizing the great frequency of severe coronary sclerosis in female diabetic patients and refers to the paper of Root et al.[17] in which the incidence of death from coronary occlusion among diabetic male patients was twice to four times as high as that among nondiabetic men of the same age group and four to ten times as high among diabetic as compared with nondiabetic women.

Cerebrovascular accidents, in contradistinction to cardiac disease, were more frequent (18.8 per cent) in the Bergen group than in either the 1946 series (9.4 per cent) or the 1944–1946 series (11.4 per cent) of Joslin. All data agree that the incidence of such accidents is much higher in female patients.

Although no cases of acute or chronic nephritis were observed by Hanssen, albuminuria was present in 5 per cent of the men and 7 per cent of the women over fifty years of age. The difference between these data, which represent a former epoch, and those in our experience with children with diabetes of long duration is expressed by Dr. Priscilla White,[18] who states that between 1940 and 1946 nephritis had become the chief cause of death in patients with the onset of diabetes in childhood. In 84 cases of childhood diabetes of more than ten years' duration, 31 patients died of nephritis. Premature development of arteriosclerosis is already yielding to better dietary and insulin treatment. Under forty years of age, severe grades of intercapillary glomerulosclerosis were found in 13 of 40 cases at post-mortem examination.[19]

Gangrene was responsible for 11 of 125 deaths in the Bergen City Hospital. Amputations were far more numerous in the Oslo City Hospital than in the Riks Hospital in Oslo. In the Joslin series, the incidence of deaths from gangrene in 651 cases from 1944 to 1946 was 2.9 per cent, — a decrease from 4.4 per cent in the earlier series, — but in the series of cases at autopsy the incidence was 12 per cent, as compared with 13 per cent in the earlier group. A percentage increase in the deaths from gangrene would not have been surprising, because of the growing number and relatively higher percentage of such cases in patients admitted to the George F. Baker Clinic, despite the lowering of surgical mortality. Hanssen calls attention to the frequency of gangrene in female patients.

For comparison two analyses (Tables 4 and 5) are given that demonstrate, respectively, the effect of the duration of diabetes on the mortality in cases in which the patients died of arteriosclerosis and coma and the changing sites of arteriosclerosis at successive periods. These tables are based on Tables 58 and 60 in the study of Joslin et al.,[6] which had not appeared when Hanssen's article was written.

*The high percentage of arteriosclerosis in the legs of young diabetic patients in the Joslin group is believed to be due, first, to the low level of nutrition of these young people, who were treated just before or just after the discovery and use of insulin in 1922, secondly, to the low-carbohydrate and relatively high-fat diet in the period mentioned, and thirdly, and above all, to the exceptionally long duration of the diabetes in these youthful patients, of whom we have had a relatively large number.

Hanssen noted the rapid disappearance of large livers in young diabetic patients following the more adequate treatment and control of the diabetes that the introduction of protamine zinc insulin made possible, an observation also made by White et al.[20] Acute hepatitis and hemochromatosis were not encountered. Gallstones were no more frequent among male diabetic patients than among the controls, but they were encountered oftener in female diabetic patients. There were 2 cases of cancer of the pancreas, but none of acute necrosis of the pancreas or of pancreatic calculi. The morbidity and mortality from tuberculosis were not of any great importance, — 4.1 per cent, — in contrast to the high incidence of the disease among diabetic patients in various European centers, notably Paris and Vienna.

What is really needed for a better understanding of both the incidence and the clinical features of diabetes is a survey of isolated localities all over the world, such as that now in progress in Oxford, Massachusetts, a town of 5000 inhabitants. Such surveys will give a true idea of the morbidity of the disease. For a knowledge of the mortality one must depend more and more on private statistics from private clinics and groups of physicians particularly interested in the disease who follow up all their cases; here again discrimination in the evaluation is necessary on account of varying local conditions.

Discrepancies between the official data of mortality and the true facts of diabetic patients dying with the disease but not of it are readily explained. Before 1914 approximately two thirds (63.8 per cent) of all diabetic patients here and abroad died of diabetic coma, an easily recognized and recorded diabetic death. Today, only 3.1 per cent of diabetic patients in our group die of coma. Approximately 9 per cent die of cancer, instead of 1.5 per cent as heretofore, diabetes thus losing precedence in statistical enumeration; 67.4 per cent died of cardiorenal vascular complications in the period since 1944, as compared with 17.5 per cent in that from 1898–1914. These and other facts regarding the causes of death of 8384 diabetic patients in our series, as well as data from various international compilations, have recently been summarized.[12]

TABLE 4. *Influence of Duration of Diabetes on Mortality in Patients Dying of Arteriosclerosis and Diabetic Coma.*[6]

PERIOD	AVERAGE DURATION OF DIABETES*	TOTAL NO. OF DEATHS	DEATHS FROM COMA	DEATHS FROM ARTERIOSCLEROSIS	AVERAGE AGE AT DEATH
	yr.		%	%	yr.
1898 to June, 1914 (Naunyn)	4.9	326	64	17	44.5
June, 1914, to August, 1922 (Allen)	6.1	836	42	24	46.7
August, 1922, to December, 1925 (Banting)	7.5	537	21	41	54.3
January, 1926, to December, 1929 (Banting)	8.4	918	11	49	60.0
January, 1930, to December, 1934 (Banting)	10.0	1741	5	58	62.7
January, 1935, to December, 1936 (Banting)	11.6	793	4	59	63.9
January, 1937, to December, 1939 (Hagendorn)	12.4	1229	4	62	64.8
January, 1940, to December, 1943 (Hagendorn)	13.3	1354	3	66	65.0
January, 1944, through May 15, 1946 (Best)	14.1	651	3	67	64.5

*Based on cases of known duration.

TABLE 5. *Site of Terminal Lesion in 4495 Diabetic Patients Dying of Arteriosclerosis.*[6]

PERIOD	TOTAL NO. OF DEATHS*	SITE OF ARTERIOSCLEROTIC LESION				
		BRAIN	KIDNEYS	HEART	PERIPHERAL VESSELS	UNDETERMINED
		%	%	%	%	%
1898 to June, 1914 (Naunyn)	57	18	18	35	21	9
June, 1914, to August, 1922 (Allen)	203	22	15	40	17	6
August, 1922, to December, 1929 (Banting)	672	20	9	49	19	3
January, 1930, to December, 1936 (Banting)	1474	18	8	57	13	4
January, 1937, to December, 1943 (Hagendorn)	1655	22	6	60	8	4
January, 1944, to May 15, 1946 (Best)	434	22	7	64	4	3

*Tabulation by the Statistical Bureau of the Metropolitan Life Insurance Company.

MEDICAL TREATMENT

Hospital costs for diabetic patients are rising, but I am sure that all physicians appreciate the fact that the cost of medical care should be and, indeed, is decreasing. The reason is plain. Hitherto the diagnosis of diabetes was usually made among the well-to-do, but a lower economic stratum of society is receiving better medical care and these patients simply do not have the money to pay for the services formerly rendered. A reorganization of medical

practice is essential to furnish the rapidly growing number of diabetic patients the treatment they need.

To live successfully with diabetes one must know the rules, and to teach these to patients is the function of the physician. In the first place, this demands more time than the doctor has at his disposal, and in the second place, it would cost the patient too much. Therefore, the doctor must get someone to do the elementary teaching for him — his wife, his child, his nurse, his secretary, his technician or another patient whom he has helped. The doctor must utilize the services of someone else, but that is not the whole of the story. At stated intervals he should assemble his patients, young and old and those with diabetes of long and short duration, and conduct a class for an hour or so. This will obviously cost the patient less than the $8.00 a day, in addition to laboratory fees, in a ward bed in a hospital; in addition, the physician will receive his return, because he will constantly be building up a group of patients who come back out of necessity for regulation or follow-up over a period more than three times as long as formerly.

The Clinitest apparatus,* although by no means perfect, simplifies the treatment of the patient enormously, and I believe that before long a simplified blood sugar test will be available. A better use of neighborhood laboratories should be made. The diabetic patients themselves should be encouraged by small contributions to bring the laboratories up to date as a protection in times of emergency.

The Changing Type of Hospital Patients

The type of diabetic patients treated in hospital wards has greatly altered, and our experience is doubtless only an epitome of that of others. In 1941 the average duration of the diabetes of the patients in our group treated at the New England Deaconess Hospital was seven years and one month. Recently, a survey revealed that patients at the same hospital had already had the disease on the average well up toward thirteen years or almost within a year of the average duration of life in all the fatal cases in the Best Era. Only 1 in 10 could attend the diabetic classes held in the adjoining George F. Baker Building, and only a few weeks later a similar survey of 34 patients showed that only 1 in 7 could attend class. For every three years since the discovery of insulin the duration of life of diabetic patients, on the basis of our fatal cases, has risen one year; it is evident that the backlog of old and crippled diabetic patients will increase and thus fill hospital beds. And the tragedy is that these patients, who have fought the disease for years and whom we respect and are glad to help, are seldom likely again to be self-supporting. Yet each of them by a prolonged stay will bar from entrance a multitude of young patients fully capable of being taught in a brief time to be efficient for years. This is why the family doctor must enter into the picture far more than ever before: it is he who can protect these thousands of diabetic patients. Contrary to many, I believe that, because of things like this, the future will, or at least can, bring the family doctor into his rightful and important place in medicine.

*Manufactured by Ames Company, Incorporated, Elkhart, Indiana.

Pregnancy in Diabetes

The obstetric series of White, Titus and Sisson continues to expand. It is to be hoped that similar reports of a similar class of diabetic patients — namely, those of considerable severity and long duration — will appear for comparison. Summaries for 271 cases are presented by Joslin et al.,[6] and the data in 23 cases of diabetes of twenty or more years' duration will be published in the March, 1947, issue of the *Medical Clinics of North America.*

The principles underlying their methods consist primarily in meticulous care of the patient with the realization that renal glycosuria is a major factor in pregnancy and that one must provide for sufficient calories to be utilized by the mother and the fetus; at the same time, with the multiple doses of insulin often required, the patient must be protected against hyperglycemia.

Toxemia of pregnancy, they believe, can be anticipated and often controlled by hormonal changes; its appearance in the latter months of pregnancy is always accompanied by albuminuria, a rising blood pressure and a gain in weight. Irrespective of these possibilities, delivery is usually favored in the thirty-seventh or thirty-eighth week by cesarean section. The healthy-appearing baby, however, should receive the attention given to a premature infant. Careful drainage, suction and oxygen and an incubator are indicated. The infant should receive no food or drink for one to three days. Obviously, the management of pregnancy in a mature multipara with slight, or even temporary, glycosuria, does not require such drastic measures.

In the presence of a rising serum chorionic gonadotropin level, diethylstilbestrol is injected daily and in increasing doses, and conversely when the urinary pregnanediol is falling, Proluton is administered daily. Even though the pregnancy is uncomplicated I gather that Dr. Titus prefers to deliver the hormonally treated patient rather than one who has not received such medication.

The latest results are 330 deliveries since January 1, 1936, with a single maternal death from hepatitis, as shown by autopsy, six weeks after delivery. The survival of infants prior to 1936 was approximately 50 per cent. In the present series, the survival rate in 61 cases of complicated pregnancy in which the mothers were not treated was 46 per cent, that in 198 complicated cases treated with hormones was 90 per cent and that in 71 uncomplicated cases, in

which the mothers were not treated with hormones, was 97 per cent.

Surgery

Reference is made to a recent article by McKittrick[21] in which advances in the surgical treatment of complications of diabetes have been set forth. Suffice it to say that, whereas in the period 1923–1941 the mortality for amputations through or above the mid-lower leg was 14.1 per cent in 609 cases, in 1942–1945 it had dropped to 4.7 per cent in 212 cases, and that for major and minor amputations it had similarly dropped from 9.7 per cent in 1036 cases in 1923–1941 to 2.6 per cent in 229 cases in 1944 and 1945. This is undoubtedly due in large measure to the use of the sulfonamides and penicillin. But technically there has been a distinct improvement in procedures for saving the feet. In the past, following the removal of a gangrenous or osteomyelitic toe, the diabetic patient returned after an interval for the amputation of another or even a far higher amputation. To overcome this Dr. McKittrick has introduced a transmetatarsal type of operation by which all the toes are removed at one time, and by the use of a long plantar flap, a useful foot is obtained. The first operation was performed in March, 1944, and by May, 1946, it had been done in 75 cases. Of these, 11 were failures, largely because operations have been undertaken in more and more serious and complicated cases to learn the limitations of this type of surgery. Staphylococci were cultured from the wounds in 52 of the 75 cases, either in pure culture or in combination with other organisms.

Miscellaneous Considerations

Diabetic Camps and Societies

A list of diabetic camps and diabetic societies was given in last year's progress report.[22] I am happy to say that in the future this listing will be continued and amplified by the American Diabetes Association.

Publications

Diabetes Abstracts, published by the American Diabetes Association, in conjunction with Eli Lilly and Company, continues to be invaluable. All are looking forward with anticipation to the publication of the *Proceedings* of the meeting held in Toronto last September when the Association joined with the University of Toronto for the celebration of the discovery of insulin by Banting and Best.

Insurance

Insurance of diabetic patients is now a *fait accompli*. A new life-expectancy table to replace that of 1938 is in process of compilation by the Metropolitan Life Insurance Company and Joslin. This is in part subsidized by the Diabetic Fund of the Boston Safe Deposit and Trust Company and by gifts to it for this purpose from two insurance companies.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

Weekly Clinicopathological Exercises

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

BENJAMIN CASTLEMAN, M.D., *Associate Editor*

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CASE 33131

PRESENTATION OF CASE

A fifty-four-year-old Irish retired elevated-railroad employee was admitted because of shortness of breath.

For the previous ten to fifteen years he had had attacks of asthma occurring at night during which he was short of breath and coughed. He was usually somewhat relieved when he brought up phlegm, which was white and thick, and he was able to breathe much better sitting up. When he had such attacks he usually spent the rest of the night in a chair and was over the attack by morning. A physician gave him "pills" for the asthma. The attacks had recently increased in frequency. For the preceding two years the patient had noted shortness of breath on exertion, particularly during the day, and the ankles had begun to swell. He was given digitalis, which he had taken irregularly ever since. The salt intake had been reduced. An electrocardiogram a year before admission had revealed auricular fibrillation (Fig. 1). On fluoroscopy the heart was moderately enlarged, and there was a prominent pulmonary artery and questionable enlargement of the left auricle. The heart sounds were distant, and no murmurs were heard. During the year the symptoms had become progressively worse, with occasional remissions, and the patient was forced to quit work. For three months before admission he had been unable to negotiate three flights of stairs. The legs swelled progressively up to the thighs, and the abdomen had become swollen. He had taken some digitalis for a few days before admission. His physician had given him mercurial diuretics.

The patient remembered having had "rheumatic fever" at the age of seventeen, when he had been kept in bed with swollen joints and had felt quite sick for about six weeks, but he knew of no heart murmur and had subsequently had no swollen joints, nosebleeds, chest or abdominal pain. He had never had high blood pressure. Up to two years before admission he had drunk one or two glasses of beer and half a pint of whiskey a day, but this had been almost entirely omitted since then.

Physical examination revealed a florid, extremely cyanotic, obese, well developed man with signs of weight loss in the face and upper extremities. He was partially sitting up in bed and breathing with moderate difficulty and with audible coarse wheezing. There was questionable icterus in the scleras. The fundi showed mild arteriosclerotic changes. There was a moderate rhinophyma. The neck

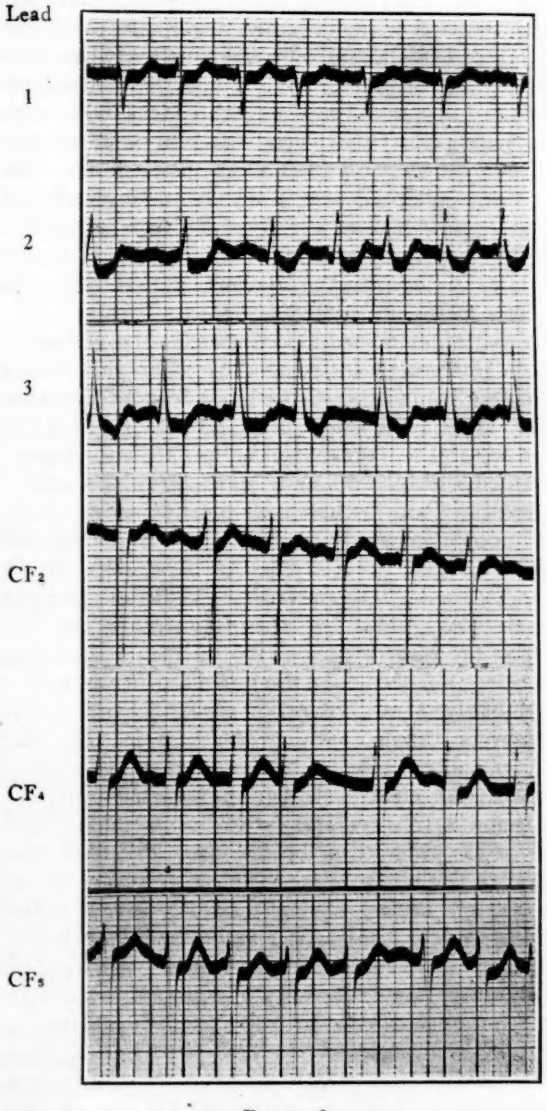

FIGURE 1.

veins were full but not pulsating. The heart was enlarged to the left, reaching the anterior axillary line, with a forceful apical beat in the fifth interspace. The rhythm was irregular and alternated between bigeminy and trigeminy with an apical

rate of about 120. The peripheral pulse was about 52. The heart sounds were loud, slapping at the apex and muffled in other areas. No murmurs could be heard when the patient was either reclining or sitting up. Examination of the chest revealed flatness and absent fremitus and breath sounds below the fourth interspace on the right posteriorly extending forward to the sternum at about the same interspace. A few moist inspiratory rales and soft expiratory rhonchi of the right lung were noted above this area. The left lung was clear except for a few moist rales at the base. The abdomen was much distended, moderately tense and revealed shifting dullness about half way up the flanks with a fluid wave. The liver could not be felt or balloted but was percussed three fingerbreadths below the costal margin. The spleen was not palpated but appeared slightly enlarged to percussion. The arm veins collapsed at a level about 10 cm. above the sternum. There was severe pitting edema of both legs and the genitalia. A reducible left inguinal hernia extended into the scrotum. The blood pressure was 160 systolic, 80 diastolic.

Examination of the blood revealed a red-cell count of 5,520,000, with a hemoglobin of 17 gm., and a white-cell count of 8100, with a normal differential count. The urine had a specific gravity of 1.018 and gave a +++ test for albumin. The sediment contained a few hyaline and rare granular casts, a few red cells and 3 white cells per high-power field. The nonprotein nitrogen was 34 mg., and the total protein 7.1 gm. per 100 cc. An x-ray film of the chest disclosed a large quantity of fluid in the right pleural cavity obscuring the right leaf of the diaphragm, the right border of the heart and the lower two thirds of the right lung field. There was a questionably small quantity of fluid in the left costophrenic angle, with an increase in the hilar shadows and prominence of the pulmonary vascular shadows. An electrocardiogram revealed auricular fibrillation at an average rate of 90 with frequent ventricular premature beats from different foci producing trigeminy in some places (Fig. 2). There was a high degree of right-axis deviation. The T waves were low in Leads 1 and 2 and inverted in Lead 3, with a sagging ST segment in Lead 2. The T waves were low in Leads CF_2, CF_4 and CF_6, with deep S waves consistent with right-axis deviation.

A right thoracentesis yielded 1000 cc. of clear yellow fluid, which greatly relieved the respiratory distress and on analysis contained 1.9 gm. of protein, no white cells and 1.129 red cells per cubic millimeter. The patient was given Purodigin and Digifolin. On the sixth hospital day about 30 cc. of fluid tinged with bright-red blood was noted in the sputum, with increased cough. There was some boggy swelling, increased heat, redness and tenderness of the calf of the right leg that the patient admitted had been present for several weeks but had recently subsided. No chest pain was noted. On the following day he appeared to have edema of the face and was drowsy, and a chest tap on the right again produced 1000 cc. of clear amber fluid with a total protein of 3.8 gm., no white cells and 1100 red cells per cubic millimeter. On the eighth hospital day minimal right-calf tenderness was present, with only slight pitting edema. A surgical consultant believed that the calf tenderness and edema could be accounted for by heart failure and advised against vein interruption. Two days later, cyanosis was still noted. The patient refused any form of oxygen therapy. He did not prefer to sit upright in bed but lay almost always on the right side. Examination of the urine at that time revealed a + test for albumin with an occasional hyaline cast. The nonprotein nitrogen was 42 mg. per 100 cc. By the fourteenth hospital day the cardiac rhythm had become normal. He continued, however, to have considerable chest fluid and ascites. Two days later, another 1000 cc. of amber, slightly cloudy fluid was withdrawn from the right chest; 900 cc. of similar fluid was taken from the abdomen. The chest fluid contained 1240 red cells and 90 white cells per cubic millimeter of which 70 per cent were polymorphonuclear cells. On the sixteenth day not much change had been noted. The heart sounds were surprisingly strong.

The patient had been refusing medication and continued to be markedly cyanotic. He had developed a decubital ulcer. On the following day another 1000 cc. of fluid was removed from the right chest, and on the morning of the twentieth day he was again coughing up dark-red blood and appeared weak. The blood pressure was 100 systolic, 80 diastolic, and the pulse was about 80 radial and 100 apical. The lungs were essentially unchanged, and there was dullness on the right up to the level of the fifth or sixth rib posteriorly. On the following day he appeared still weaker. The blood pressure was 70 systolic, 50 diastolic. He became disoriented and finally unresponsive, with small convulsive jerks in the left arm and absent reflexes. Aminophyllin and continuous oxygen were without effect, and he finally died on the twenty-third hospital day.

Differential Diagnosis

Dr. Paul D. White: I am not at all sure whether any of the asthmatic attacks had anything to do with what followed. I wonder whether the patient had been studied particularly for this situation and whether we have any information about tests for allergy.

Dr. Howard B. Sprague: He had not been tested.

Dr. White: One wonders if the asthma was coincidental or part and parcel of the disease process

under consideration. Perhaps Dr. King will tell us about that later. Asthma at night may be a different kind of condition, but as I understand it, bronchial asthma can bother patients mostly at night.

Was the shortness of breath on exertion a sequel to the story of asthma such as we frequently see?

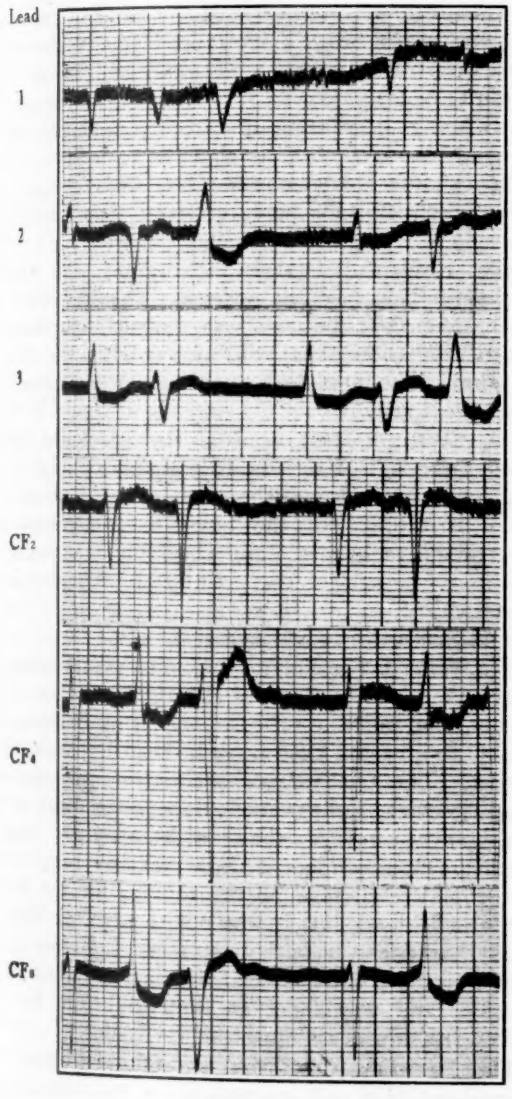

FIGURE 2.

Was this a case of chronic bronchiectasis in a patient with asthma and shortness of breath on exertion, as well as at other times, due to pulmonary insufficiency and not to cardiac insufficiency? Or was the shortness of breath a cardiac symptom?

The swelling of the ankles indicates either myocardial failure or local stasis. We cannot tell at this point whether the ankle swelling was equally bilateral. We must certainly think of the possibility of beginning heart failure. If due to beginning heart failure, did the swelling follow left ventricular failure, or was it primarily from right ventricular failure? The ankle swelling was thought to be of cardiac origin, for the patient took digitalis irregularly, for cyanosis as well as for the dyspnea.

He had auricular fibrillation, and of course with the history to this point one wonders about mitral stenosis. Since the left auricle was not large and since no murmurs were heard, we have some serious arguments against such a diagnosis.

He had increasing circulatory failure, probably myocardial in origin. I judge that from the age of seventeen until he was forty, when he began to have asthma, he had been quite well. Is that true? I believe that you know something about the history, Dr. Sprague.

DR. SPRAGUE: Yes; that is true.

DR. WHITE: I assume that he was active and that he had never had high blood pressure.

DR. SPRAGUE: That is so.

DR. WHITE: "Physical examination revealed a florid, extremely cyanotic, obese, well developed man." That sentence has one important expression — that is, "extremely cyanotic." The degree of cyanosis was evidently impressive.

The wheeze is interesting. Was that due to pulmonary disease or pulmonary congestion from left ventricular failure? The description is not that usually seen with left ventricular failure and consequent pulmonary vascular engorgement.

The scleras were icteric. Did they become more definitely so, or did that remain a questionable sign?

DR. SPRAGUE: They did not become more icteric.

DR. WHITE: "The neck veins were full but not pulsating." That finding suggests considerable venous pressure and could go with the marked edema that the patient showed.

I assume that the large pulse deficit was due to the fact that the second and third beats of the bigeminy and trigeminy did not reach the wrist.

There were no murmurs. That statement should be underlined as being extremely important.

He showed evidence of hydrothorax, as well as a considerable amount of ascites. There is one sign not mentioned that I should like to ask about. Was there any clubbing of the fingers?

DR. SPRAGUE: No.

DR. WHITE: That is significant for certain reasons with reference to both the lungs and the heart. Certain kinds of congenital heart disease, particularly the tetralogy of Fallot, with considerable cyanosis and no pulmonary disease, are associated with clubbing, as is, of course, subacute bacterial endocarditis.

The blood studies did not indicate a polycythemia. That is important.

The urinary findings could have been due to renal congestion alone.

We must look into the degree of enlargement of the lung hilar shadows, the size of the left auricle and the condition of the mediastinum. May we see the x-ray films?

DR. RICHARD SCHATZKI: We have only these two films taken at the time mentioned in the record. The large amount of fluid on the right side can be seen. It obscures completely the right border of the heart, which is unfortunate. From the film alone I am not sure that there was fluid in the left pleural cavity. The left lung is fairly large. Of what we can see of the pulmonary vessels the ones on the left side are almost completely obliterated but show some distention, which is also visible in the lateral view. The pulmonary conus is slightly prominent. The apex of the heart reaches farther to the left than normal. How much of that is due to enlargement of the heart and how much to displacement of the heart by the fluid is difficult to say from the film at hand.

DR. WHITE: The heart was not so large as I thought from the earlier description on physical examination, but I suppose that there may have been some change at that time. There was still a moderate amount of space between the left border of the heart and the left chest wall. It was not one of the enormous hearts that one sees in mitral stenosis, in which the heart nearly fills the chest. Do you see any scars of pulmonary infarction?

DR. SCHATZKI: Not in the small amount of lung that I can see.

DR. WHITE: Is anything wrong with the aorta?

DR. SCHATZKI: I can see just the edge of the arch of the aorta, and that is of approximately normal size for a patient of this age.

DR. WHITE: The trachea is not particularly deviated?

DR. SCHATZKI: It is normal in position.

DR. WHITE: It is always unsatisfactory, for me at any rate, to read interpretations of electrocardiograms without seeing the actual film or print, just as it is with an x-ray film. Even without my asking, these electrocardiographic films were sent to me, so that I have a fair idea of the moderately high degree of right-axis deviation. It is not so marked as one sees with the tetralogy of Fallot. It is consistent with two or three other conditions. I think that generally we see a higher degree of right-axis deviation, including prominence of the S waves in the precordial leads with an auricular septal defect, although we have occasionally seen as much as this with a cor pulmonale. With mitral stenosis a moderate degree of right-axis deviation is occasionally found. The ventricular rate was rapid, — nearly 140, — so that that could have increased the degree of heart failure at the time, and it looked as if there was considerable sagging of the ST segments, suggesting digitalis effect, although one would expect a lower rate if there had been a high degree of digitalis effect. That was the first film. There is a second tracing, described in the record, showing ectopic beats and producing a bigeminy and trigeminy. The usual ventricular complexes look much the same, and auricular fibrillation is present as in the first record, but we have an important change: the trigeminal ectopic beats alternate in appearance and move in opposite directions (Fig. 2). This occurs regularly throughout the tracing; one might almost label it the beginning of paroxysmal ventricular tachycardia with beats alternating in direction. This is considered an unfavorable sign — an indication of toxicity close to that due to a fatal dose of digitalis. Was much digitalis being given at that time, Dr. Sprague?

DR. SPRAGUE: That is the rhythm with which the patient entered the hospital. The digitalis had been given outside and was omitted temporarily after admission; that did away with the toxic rhythm. The first electrocardiogram was taken a year previously.

DR. WHITE: This unusual rhythm could have been the result of serious digitalis intoxication, but we have seen it in other extremely ill patients. Such irritability of the heart tends to lead to ventricular tachycardia and fibrillation and death.

What was the blood Hinton or Wassermann reaction?

DR. SPRAGUE: It was negative.

DR. WHITE: The electrocardiogram points strongly to marked enlargement of the right ventricle and is not the pattern of coronary heart disease, in which an inverted QRS wave in Lead 1 occasionally occurs. The QRS waves are narrow and are in keeping with right ventricular enlargement predominantly, rather than with coronary heart disease. One wonders if there was any suggestion of neoplastic disease in the thorax, for the fluid contained blood, but it was not the typical bloody fluid that one sees with neoplasm. I wonder how the Purodigin was given. Was it administered outside, and was there an interval before he received it again in the hospital?

DR. FREDERIC C. GOETZ: He refused medication for several days and was then given Digifolin intramuscularly.

DR. WHITE: The patient then had what seemed like a thrombosis of the leg, with pulmonary infarction as a complicating factor.

"By the fourteenth hospital day the cardiac rhythm had become normal." Was that true according to the electrocardiogram, or thought to be true?

DR. SPRAGUE: It was less irregular after the disappearance of the toxic rhythm.

DR. WHITE: The ectopic beats had disappeared, but the fibrillation may still have been present.

DR. SPRAGUE: Yes; it was.

DR. WHITE: The patient then showed a small pulse pressure, only 20 mm.

This is certainly an unusual picture, and we must try to fit in several findings that are not often seen together. These are the years of asthma causing nocturnal orthopnea, the congestive heart failure, the deep cyanosis without finger clubbing, the auricular fibrillation (with many ectopic beats), the marked right-axis deviation apparent in the electrocardiogram, the absence of heart murmurs and the blood spitting. The last sign may have occurred terminally; there was no mention of early blood spitting.

One naturally thinks at once of the so-called "black cardiacs" or *cardiaques noirs* of Ayerza, or Ayerza's syndrome, which is more of a syndrome than a disease, in which the combination of pulmonary vascular disease and peripheral stasis secondary to right heart failure is responsible for the cyanosis. Bronchial asthma does not produce cyanosis, except in the rarest cases, of which I have not seen an example. I have always wondered if severe prolonged bronchial asthma might not come to us here, but the asthmatic patients that I have seen for years have not been cyanotic and have not died of heart failure.

Was this endarteritis obliterans (syphilitic, or more probably not)? We have not seen syphilitic endarteritis obliterans here. We have encountered endarteritis obliterans of the lungs, but so far as I know, it has been unexplained, so-called "idiopathic endarteritis." Periarteritis nodosa, or simply extensive fibrosis compressing or otherwise involving the arteries of the lung, must also be considered. Certainly, chronic cor pulmonale with final failure of the right heart is a strong probability. Can there have been not only terminal pulmonary infarction but also earlier repeated attacks in large part responsible for a chronic cor pulmonale? That is what we have seen here in rare cases — namely, attacks of repeated and extensive pulmonary embolism that can lead with survival to chronic cor pulmonale.

What else must one consider in the differential diagnosis? Could there have been mitral stenosis? That is possible, but I suppose that it is less likely than chronic cor pulmonale. To be sure, auricular fibrillation was present, but it should have set in years previously before failure developed rather than so late in life — the congestive failure came apparently before the auricular fibrillation.

DR. BENJAMIN CASTLEMAN: The patient was not examined at that time, and we do not know that the congestive failure was not present.

DR. WHITE: It was noted for a year but may have been present longer. Also, if there were enough mitral stenosis to produce such a clinical picture as this, someone at some time should have heard a murmur. Although exceptions have been reported, I have never encountered a case of marked mitral stenosis without a murmur. Moreover, the left ventricular auricle was not large, and it looks as if there was too much right-axis deviation, although I have seen cases of this degree of right-axis deviation with mitral stenosis.

We must also consider congenital heart disease, but we do not know how long this patient had been cyanotic — probably not constantly since childhood, with this degree of cyanosis. The tetralogy of Fallot does not seem to be in keeping in this case, for this kind of history without clubbing of the fingers but with auricular fibrillation is not seen, so far as I know, in cases of tetralogy of Fallot. A large auricular septal defect is also a possibility — the patient was old for the tetralogy of Fallot, but not too old for an auricular septal defect, which may be almost symptomless until well into middle age. The strain of an overloaded pulmonary circulation can cause failure of the right side of the heart and death. Auricular fibrillation is a rare accompaniment of congenital heart disease but a possible complication in Lutembacher's disease, which consists of the combination of an auricular septal defect and mitral stenosis.

Then there are the rare conditions that should be thought of in any difficult case: tumors involving the heart, malignant or benign, for which we have no clue in this case; a mediastinal tumor compressing the pulmonary artery; and unusual infestation by parasites, which so far as I know does not produce such a picture as this except in dogs with filariasis involving the right heart and pulmonary arteries that causes a subacute cor pulmonale from plugging of the pulmonary arteries and right ventricle by the filarial parasites themselves. Malnutrition (beriberi), poisoning, endocrinopathy and myocarditis or other involvement of the right ventricle of unknown cause are some of the other rare conditions that should be thought of but not diagnosed in this case. Hypertension and atherosclerosis, which primarily involve the left ventricle, do not fit, nor does thyroid disease or syphilitic aortitis, unless there was a bizarre, almost unique aneurysm of the ascending aorta compressing the pulmonary artery and causing a chronic cor pulmonale, of which we have seen a few cases. Constrictive pericarditis also seems to be out.

My diagnosis therefore rests between chronic cor pulmonale due to pulmonary endarteritis obliterans or to repeated pulmonary embolism or thrombosis with right ventricular failure and, second best, a congenital auricular septal defect, with or without mitral stenosis (Lutembacher's disease), which we are unable to diagnose because of the absence of a murmur, with failure of the right side of the heart, in either case complicated by digitalis toxicity and terminal pulmonary infarction. I am torn between

these two interpretations. I think that I favor the first, — namely, a chronic cor pulmonale, — but I would not be surprised to find the second, or indeed something else.

DR. SPRAGUE: It is reassuring to have Dr. White argue the same way as we did in this case. I saw the patient only when he was extremely ill in the hospital. Routine electrocardiograms were sent to the laboratory, and Dr. Williams interpreted them as consistent with rheumatic heart disease. He found that the house officer in requesting the electrocardiogram had made the diagnosis of rheumatic heart disease. He then remembered that he had seen this patient a year before, when he was ambulatory and rapidly fibrillating prior to digitalization. I asked him to examine the patient again. We listened closely for a mitral diastolic murmur, but we were unable to hear it. Knowing that the patient had been examined previously when not in extremis, we thought that we had further evidence that he did not have mitral stenosis. In retrospect the one thing that we should have put more emphasis on and that I had put in my notes was that the first heart sound in this man remained louder, or at any rate of better quality, than he should have had when he was so sick.

DR. WHITE: That makes me turn a little more toward mitral stenosis.

DR. SPRAGUE: The heart sound was noted as loud by Dr. Goetz, who said that the patient had mitral stenosis.

DR. DONALD S. KING: I thought from the history that this was not bronchial asthma. The illness sounded circulatory to me.

DR. WHITE: Do you usually find an exaggeration of symptoms in bronchial asthma at night?

DR. KING: Not as the history is given here. It suggests mitral stenosis.

DR. CONGER WILLIAMS: I should like to say that the cyanosis was the thing that led most of us to discard the diagnosis of mitral stenosis in favor of chronic pulmonary disease. We did not believe that it was straight bronchial asthma but thought that it was possibly a lung condition, pulmonary fibrosis or something of that sort.

DR. SPRAGUE: We thought that the patient might have had thrombosis of the pulmonary artery.

DR. ISAAC TAYLOR: One striking thing on listening to the lungs was the severe prolongation of expiration, which persisted until the end and became marked.

CLINICAL DIAGNOSES

Cor pulmonale.
Pulmonary fibrosis and emphysema.
Pulmonary infarcts.

DR. WHITE'S DIAGNOSES

Cor pulmonale, with congestive heart failure and auricular fibrillation or auricular septal defect, with or without mitral stenosis (Lutembacher's disease).
Pulmonary infarction (terminal).
Digitalis intoxication.

ANATOMICAL DIAGNOSES

Rheumatic heart disease, with severe mitral stenosis.
Cardiac hypertrophy, marked, right ventricle.
Pulmonary infarct.
Endocarditis, chronic rheumatic, slight, aortic and tricuspid.
Cardiac and portal cirrhosis.
Pulmonary emphysema, slight.
Anasarca.

PATHOLOGICAL DISCUSSION

DR. CASTLEMAN: We found 6000 or 7000 cc. of fluid in the abdomen and a similar amount of fluid in the right chest. There was none in the left pleural cavity. In the apex of the right lower lobe there was an infarct that measured about 4 or 5 cm. in diameter but no other infarct in the right lung and none in the left lung.

DR. WHITE: Was there any suggestion of old scars in the lungs — that is, of infarcts?

DR. CASTLEMAN: No; the heart was large, weighing almost 700 gm. The right ventricular wall was thick, measuring 1 cm., about three times the normal size. The left ventricle measured 16 mm. in thickness. The tricuspid valve ring was markedly dilated, measuring almost 16 cm. in diameter, and there was slight thickening and shortening of the chordae tendineae of one leaflet. The dilatation of the right auricle was tremendous, measuring in one diameter about 14 cm. We were unable to find any opening between the right and left auricles. The mitral orifice was merely a rigid slit measuring 1 cm. long and about 0.5 cm. in its greatest diameter. The valve was thickened and extensively calcified. The left auricle was large and thick. The aortic cusps showed some interadherence, but not enough to produce any appreciable stenosis. There was therefore severe mitral stenosis and only minimal rheumatic involvement of the aortic and tricuspid valves.

There was evidence of generalized chronic passive congestion. The liver was somewhat large and was quite cirrhotic. On microscopical examination, I believe that there was a combination of both cardiac and portal cirrhosis.

DR. WHITE: The history of the auricular fibrillation is important in the absence of the murmur of mitral stenosis.

DR. CASTLEMAN: There was a mural thrombus of the right auricle, which was probably the source of the pulmonary embolus, since the leg veins were free from thrombi. Although the lungs showed some emphysema, I believe that mitral stenosis was responsible for the right-sided cardiac hypertrophy.

DR. WHITE: In this case, if I had relied on the electrocardiogram alone, I would have made the correct diagnosis, since almost nothing other than considerable mitral stenosis of long standing can give rise to a pattern like this — namely, the combination of right-axis deviation and auricular fibrillation. The possibility of considerable mitral stenosis, however, with no murmur at all, little enlargement of the left auricle evident fluoroscopically and a high degree of cyanosis seemed even more exceptional, and I therefore chose to consider the electrocardiographic pattern as an exception to the rule. This case has stimulated us to investigate the relative rarities of these various exceptions.

CASE 33132

PRESENTATION OF CASE

First admission. A thirty-seven-year-old machinist entered the hospital because of a generalized rash, malaise and sore throat.

Two months before admission and eight days after promiscuous kissing at a party a nontender lesion similar to a cold sore developed on the right lower lip. A succession of three lesions then appeared on the chin. A physician treated them with boric acid salve without improvement; another physician gave him penicillin salve after which the sores dried somewhat, but they never healed. A week before admission the patient developed a generalized rash with much malaise, sore throat and swelling of the lymph nodes in the neck.

Physical examination showed a generalized maculopapular eruption, mucous patches over the hard palate and cervical lymph-node enlargement. Colonies of *Treponema pallidum* were identified on dark-field examination of the lesion on the lip. The blood Wassermann reaction was positive. The patient was treated with 2,400,000 units of penicillin over a period of seven and a half days. The eruptions faded and he was discharged.

Final admission (eleven months later). Following discharge the patient was seen frequently in the Out Patient Department. No further treatment was carried out. The blood Hinton and Wassermann tests became negative in the course of several months, and he was symptom free until two months before admission. At that time he began to have attacks of headache, dizziness and a sense of burning and obstruction of the nose that were thought to be brought on by acid fumes inhaled from a soldering process at work, although they were admitted to have occurred on the street without apparent instigating cause. A month before admission there were several episodes of chills followed by nausea. The patient had visual hallucinations at work, seeing people in places where he knew they could not be. He had been drinking heavily, owing to worry about his illness. The visual hallucinations ceased when he stopped drinking, but the other symptoms persisted. The headaches increased, centering especially just above the eyes. A week before admission he began to vomit occasionally, and the headache was so severe that sleep was impossible.

Physical examination disclosed a slightly disoriented patient complaining of photophobia and constantly rubbing his eyes. The abnormal physical findings were limited to the neurologic examination. There was moderate to marked tenderness over the right frontal sinus and antrum. The neck was not stiff. Odor perception was markedly impaired but not absent on the right, and was normal on the left; the air passages were not obstructed, nor was there any nasal discharge. Visual acuity on the right was 20/40, and on the left 20/50. The right pupil measured 3 mm., and the left 2 mm.; both reacted slightly to light but not to accommodation. There was a completely congruous left homonymous hemianopsia with splitting of the macula lutea. The extraocular movements and the fundi were normal. The rest of the cranial nerves were normal. The left arm and leg were weak. The tendon reflexes were normal and equal on both sides. There was no ankle clonus. Pain, touch, position and vibration perceptions were normal.

The temperature was 99°F., the pulse 76, and the respirations 20. The blood pressure was 120 systolic, 80 diastolic.

The red-cell and white-cell counts and the hemoglobin were normal, and examination of the urine was negative. On lumbar puncture the initial spinal-fluid pressure was equivalent to 150 mm. of water. The fluid was clear and contained 94 lymphocytes, 0 neutrophils and 0 red cells per cubic millimeter; the total protein was 125 gm., and the chloride 122 mg. per 100 cc.; the gold-sol curve was 0112223322. Two blood and spinal-fluid Hinton tests were negative. X-ray films of the skull and sinuses showed no erosion of the cribriform plate or other abnormalities. The electrocardiogram was "within normal limits" except for rather questionable disturbances on the right side, especially anteriorly toward the midline.

While in the hospital, the patient complained constantly of pain in the right frontal region and behind the right eye. Burning sensations in the right side of the nose occurred frequently. The hemiparesis and hemianopsia persisted. Lymphocytes were found on repeated lumbar puncture, and the spinal-fluid protein remained elevated. An operation was performed on the eighteenth hospital day.

DIFFERENTIAL DIAGNOSIS

DR. G. COLKET CANER: It seems to me that at the second entry the question that probably first preoccupied the house staff was whether the patient's symptoms were due to syphilis. He had had

primary and secondary syphilis about a year previously, and the treatment given at that time is generally considered to be the minimal adequate penicillin treatment in early secondary syphilis. Dr. Rose tells me that such treatment can be expected to give a cure in a high percentage of cases but that at present a course of bismuth injections would undoubtedly be given at the same time. The fact that the blood Hinton test changed to negative indicates that the treatment was probably adequate in this case. But we have no spinal-fluid examination, and in a case with secondary syphilis a spinal-fluid examination ought to be made six months after treatment and again a year later because during the secondary stage of syphilis the central nervous system is invaded and one cannot be sure that treatment adequate to change the blood Wassermann and Hinton reactions to negative will also be adequate to eradicate the infection from the nervous system. In this case there was no spinal-fluid examination prior to the second entry so that the staff could not have been entirely sure that the treatment given had been adequate.

Irrespective of whether the patient's syphilis was treated adequately there is evidence that the patient himself was not treated adequately because he apparently worried so much about his illness that he began drinking heavily. It is, of course, important not only to treat the illness but also to treat the patient. In particular the patient should be helped to take his illness well and to react well also to other things in his life that might be upsetting to him. The physician can often contribute more in this direction than he can in treating a disease itself.

Going back to whether or not the patient's symptoms were due to syphilis, although the spinal-fluid examination showed a number of changes characteristic of syphilis, — namely the high lymphocyte count, the high total protein and the change in the gold-sol curve, — there were two negative spinal-fluid Hinton tests. Sometimes in syphilitic meningitis the Hinton test is negative at the first spinal puncture but at the second puncture the test is almost always positive. In a syphilitic meningitis, the blood Hinton reaction is also almost always positive, and the fact that there were two negative blood Hinton tests is also strong evidence against syphilis. Additional evidence against syphilis is the fact that the total protein was higher than one would expect with this lymphocyte count, if the count were due to syphilis. A count of 94 lymphocytes per cubic millimeter due to syphilis would be accompanied by a total protein of 55 or 60 rather than one of 125 gm. per 100 cc. It is also hard to explain the homonymous hemianopsia on the basis of meningovascular syphilis or of syphilitic meningitis. A syphilitic meningitis would also cause a stiff neck and a generalized headache, whereas this man's headache was fairly well limited to the orbital region and to the supraorbital and infraorbital regions. For all these reasons I think that syphilis can be ruled out.

If syphilis is not the diagnosis, what else could have caused the spinal-fluid findings? As possibilities one might think of poliomyelitis and multiple sclerosis, but obviously the history does not suggest either diagnosis. One thinks also of brain abscess, but in brain abscess one would expect a number of neutrophils in the spinal fluid in addition to the lymphocytes. Also, the total protein was rather high in comparison to the number of cells for brain abscess. I therefore think that brain abscess is unlikely, too.

Then one comes to tumor, and it seems to me that tumor is the likeliest diagnosis. Tumor, of course, frequently gives a high protein and with the high protein there can be changes in the gold-sol curve. Tumor does not often cause such a high lymphocyte count in the spinal fluid, but it may do so and when it does polymorphonuclear leukocytes are usually present in addition to the lymphocytes. But sometimes the increased count in the spinal fluid is limited to lymphocytes, as in this case.

If the spinal-fluid changes were due to tumor, where was the tumor located? It seems to me that the most definite finding that we have to go on is the homonymous hemianopsia with splitting of the macula, which is usually caused by a lesion located where the macular fibers are well bunched; they are well bunched either at the extreme posterior part of the occipital lobe or in the optic tract. If the lesion had been in the extreme posterior part of the occipital lobe it seems to me that it would be hard to explain the left hemiparesis, and the dilated right pupil would also be hard to explain in the absence of marked pressure. It would perhaps be possible to account for the fact that the headache was centered in the back of the orbit because the tentorium is innervated by the fifth nerve and sometimes pressure on the tentorium causes referred pain to the back of the orbit. If, however, the tumor were located at the base of the brain involving the right optic tract and causing pressure on the right cerebral peduncle it could readily explain the picture. A lesion there could involve the third nerve, causing a slightly dilated pupil; it could also involve the trigeminal nerve and give rise to extreme pain in the orbit and in the supraorbital and infraorbital regions and perhaps to the stinging pain in the nose. A lesion in this region would not account for the failure of the pupils to react to accommodation, but this finding is hard to explain by any lesion that would also cause a homonymous hemianopsia. Patients often do not try to focus the eyes on a finger held close to their eyes, however, and if they do not there is no reaction to accommodation. To get patients to focus one may have to ask them, for instance, to tell the time by looking at a watch held close to the eyes. I therefore do

not lay much stress on the lack of pupillary reaction to accommodation.

A tumor at the base of the brain fairly often gives a number of lymphocytes in the spinal fluid, so that such a location would go with the spinal-fluid findings. A tumor in this region would not have to be large to cause the signs and symptoms presented, and a small tumor might account for the fact that the spinal-fluid pressure was not high.

Another possible location is the temporoparietal lobe, but a tumor there would have to be large to give a complete homonymous hemianopsia with splitting of the macula because the macular fibers in this portion of the optic radiations are well spread out. But a large tumor seems somewhat unlikely because of the localized headache and the low spinal-fluid pressure.

It therefore seems to me that the likeliest diagnosis is a tumor at the base of the brain involving the right optic tract and causing pressure on the spinal tract in the cerebral peduncle. I remember a case some years ago of a cholesteatoma in this region, but that is an unusual tumor, and I am not definite about the type of tumor in the case under discussion.

I am not sure enough of the location to suggest operation without a ventriculogram, and I imagine that that was done as part of the operation.

Dr. Charles S. Kubik: Dr. Rose, would you like to comment?

Dr. Augustus S. Rose: I was on duty at the time the patient was admitted to the Neurological Service, and I might say that we went through the same type of reasoning as Dr. Caner. As always, however, when the patient is seen one gets quite a different impression from that obtained on mere reading of the protocol. The first diagnosis that we considered was syphilitic meningitis. As was said at the time the proper diagnosis was made, a similar case would lead to a similar mistake. In other words, when a man who has had early syphilis adequately treated or presumably treated adequately and less than a year later develops headaches and lymphocytes in the spinal fluid, the case is syphilitic meningitis until proved otherwise. On the other hand this man was drowsy on admission. That was not emphasized in the record, and the history of alcoholism was somewhat more than is indicated. Subdural hematoma was our second diagnostic consideration, and yet the homonymous hemianopsia was against that. Finally, surgery became inevitable.

Dr. Kubik: As Dr. Caner suggested, this patient had a ventriculogram before he was operated on. I suppose we might see the films now.

Dr. Milford Schulz: These are rather representative films. One can see the entire ventricular system, somewhat increased in size and displaced to the left, the third ventricle as well as both lateral ventricles. The right lateral ventricle is pushed or displaced beneath the tentorium. The lateral view is not helpful. The anteroposterior view seems to be the most useful and indicates a large space-occupying lesion in the right hemisphere, probably in the temporoparietal region.

Clinical Diagnosis

Syphilitic meningitis?
Subdural hematoma?

Dr. Caner's Diagnosis

Brain tumor, type undetermined.

Anatomical Diagnosis

Glioblastoma multiforme, right temporal lobe.

Pathological Discussion

Dr. Kubik: A right temporal-lobe tumor was found at operation. Biopsy diagnosis at operation indicated that it was glioblastoma multiforme, and no attempt was made to remove it. The patient remained in coma and died on the third or fourth postoperative day.

Dr. Lewis K. Dahl: May I ask if the symptoms that Dr. Caner interpreted as evidence of fifth-nerve involvement might not have represented attacks of uncinate epilepsy?

Dr. Rose: I might say in that connection that before operation the sensations that the patient called pain were thought to be attacks of uncinate epilepsy.

Dr. Kubik: Lantern slides of serial coronal sections of the brain showed a tumor in the lower medial portion of the right temporal lobe. The cut surface had the necrotic grayish-yellow appearance that is characteristic of a glioblastoma multiforme. The tumor was in close relation to the third nerve, and it is rather surprising that there was not more evidence of third-nerve involvement than a slightly enlarged pupil. Its close proximity to the cortical spinal tract in the cerebral peduncle probably accounted for the hemiparesis, and the involvement of the optic tract lateral to the peduncle explained the homonymous hemianopsia. An interesting feature was the invasion of all the subependymal tissues outside the lateral ventricles by tumor. Histologically, the tumor was a glioblastoma multiforme. In many places there was infiltration of the subarachnoid space with a few plasma cells. There was some perivascular lymphocytic infiltration in the medulla. The cellular infiltration at a distance from the tumor, taken in connection with the history, was suggestive of syphilis.

Dr. James A. Meath: In answer to Dr. Dahl's question, I would like to say that it was because this patient had attacks of uncinate epilepsy that he was treated on the Neurological Service. The symptom of difficulty in smelling was also possibly due to the tumor.

Dr. Kubik: The tumor invaded the uncinate gyrus and so created a condition in which attacks of uncinate epilepsy might have occurred.

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CANCER MONTH

The designation of April as Cancer Month is assuming greater significance each year. As *Cancer Facts*, a pamphlet published a year ago by the Metropolitan Life Insurance Company, points out, the cancer death rate per 100,000 population increased from 64.0 in 1900 to 120.3 in 1940. This does not necessarily mean that cancer in any particular age group is becoming more prevalent, but it does indicate that the percentage of persons in the older age groups has markedly increased and that there has been an improvement in diagnostic procedures. In 1943, cancer was the most frequent cause of death in women thirty-five to fifty-four years old, and the second most frequent in those fifty-five to seventy-four; it was second in men from forty-five to seventy-four. Death rates are highest in the large cities, and lowest in rural areas, which merely points out that more cases are diagnosed in places where adequate medical facilities are widely available. In women, approximately 40 per cent of cancers occur in the digestive tract, and a like percentage in the genital organs, including the breasts. In men, more than 50 per cent of cancers are found in the digestive tract, with about 20 per cent in the genitourinary tract and over 10 per cent in the lungs. Among the industrial policyholders of the Metropolitan Life Insurance Company, there has been a steadily increasing downward trend in cancer deaths among women, and there has even been a slight drop among men in recent years.

All these facts serve to emphasize the need for the early diagnosis of cancer, and its prompt treatment. It is well known that at least 80 per cent of women with breast cancer can be cured if a radical operation is performed before the malignant growth has spread to the axilla through the lymphatic vessels. That a "lump" in the breast is easily recognizable by the patient and that women have become increasingly aware of the significance of such a lump are undoubtedly largely responsible for the decrease in deaths from cancer among women, but many cures of cancer in other locations could be effected if the persons could be educated to undergo semiannual or annual physical examinations and also to go to a physician when certain symptoms are experienced.

In the past, cancer education by state departments of health and by organizations such as the American Cancer Society has been chiefly directed to the public. It is becoming more and more apparent, however, that the general practitioner and other physicians who see relatively few cases of cancer each year should be kept well informed concerning the most recent advances in diagnosis. For this reason the American Cancer Society has decided to issue a monthly publication *Cancer*, which will be sent to all practicing physicians in the United States. In this way it is hoped that physicians will become increasingly aware of symptoms that suggest cancer, that their patients will be warned concerning the need for reporting such symptoms, that all such cases will be referred, if necessary, to someone properly qualified to make the diagnosis and to give treatment and that the number of deaths due to cancer will markedly decrease.

THE "VOLUNTARY HOSPITAL"

One of the more important talks presented at the Massachusetts General Hospital's Ether Day Centenary last October was that of Dr. Nathaniel W. Faxon, director of the hospital, entitled "The Voluntary Hospital — How Can It Survive in the Modern World?" This paper, which is published elsewhere in this issue of the *Journal*, merits particular attention because it concerns us all, doctor and layman alike.

The term "voluntary hospital" is applied to nonprofit, nonpolitical institutions, praiseworthily common in this country, that have been established as philanthropic organizations, designed for the common good. As leaders in their field from the start, they have set the pace and made the advances. That the Massachusetts General Hospital should be a leader and a pioneer among the hospitals of this type is purely circumstantial; it does not affect the point of Dr. Faxon's argument.

The point is that the question of the survival of the voluntary hospital is now before us to be answered, and that question applies particularly to the most valuable and consequently the most costly of these institutions — the hospital that adds to its service of caring for the sick the services also of scientific research and of training medical, nursing and technical personnel.

The high cost of dispensing these services has always been met, precariously, by two sources of income. The lesser of these has been the payment for services from patients and from agencies responsible for patients. The greater and more important has been derived from the gifts received perennially from well-to-do and philanthropically minded persons. As a result of increased taxation and decreased available incomes, the latter vital revenue is drying up at the source. The will may still be present, but, to make practical a familiar quotation, the giver without the gift is bare.

An actual injustice generally prevails, moreover, whenever third parties enter into the contract between hospital and patient — state, city and town departments of welfare, a variety of federal agencies and the insurance companies operating under workmen's compensation acts. None of these, so far as we can say at the moment, despite their avowed commitments, have ever met their financial responsibilities in full. The deficits that they leave have to be met by hospital funds, sometimes from principal and sometimes from the revenue derived from community-chest allotments. It should be as much a source of shame as it is of sorrow that the insurance companies and the governmental agencies are willing to rely for the fulfillment of their contracts on the meager funds of charitable hospitals.

Since hospitals can no longer continue to make up the difference between the costs of caring for patients and the part of the costs that governmental and other agencies have so far been willing to discharge, and since the better hospitals are loath to settle for less expensive and lower grade care for such beneficiaries, it seems high time that these agencies prepared themselves to pay in this respect full price for what they are receiving.

MASSACHUSETTS MEDICAL SOCIETY

TREASURER'S REPORT COVERING REFUND DISTRIBUTION

The Treasurer of the Massachusetts Medical Society makes the following report regarding the refund to district societies for 1947:

The Council voted to distribute the sum of $4000 to district societies. The total number of payments of annual dues received by the Treasurer by March 1, to be counted for the refund, was 4527. Therefore, the refund to the district societies for each paid fellow is $0.8836.

The following table gives the number of payments, as of March 1, and the refund to each district as of March 17:

District	Number Reported Paid	Refund
Barnstable	44	38.88
Berkshire	127	112.21
Bristol North	66	58.31
Bristol South	181	159.93
Essex North	175	154.63
Essex South	261	230.62
Franklin	40	35.34
Hampden	301	265.96
Hampshire	64	56.55
Middlesex East	135	119.28
Middlesex North	114	100.73
Middlesex South	918	811.14
Norfolk	818	722.78
Norfolk South	138	121.93
Plymouth	130	114.87
Suffolk	566	500.11
Worcester	367	324.28
Worcester North	82	72.45
	4527	$4000.00

In 1946, for comparison, the total number of payments for the refund was 3965.

Eliot Hubbard, Jr., M.D., *Treasurer*

DEATH

ELLISON — Daniel J. Ellison, M.D., of Lowell, died suddenly on February 14. He was in his sixty-second year.

Dr. Ellison received his degree from Tufts College Medical School in 1908 and practiced in Alton, New Hampshire, before

moving to Lowell. Of late years he had limited his practice to internal medicine, being particularly interested in diseases of the heart. He had always been active in the affairs of the Middlesex North District and Massachusetts medical societies having been a councilor for many years, as well as a member, and often the chairman, of several important committees. He was a senior physician at the Lowell General, St. John's and St. Joseph's hospitals, a member of the American Heart Association and the New England Obstetrical and Gynecological Society and a fellow of the American Medical Association.

His widow and a daughter survive.

NEW HAMPSHIRE MEDICAL SOCIETY

DEATH

FOX — George L. Fox, M.D., of Exeter, died recently. He was in his fifty-ninth year.

Dr. Fox received his degree from McGill University Faculty of Medicine in 1924. He was a fellow of the American Medical Association.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

Clinic	Date	Clinic Consultant
Haverhill	April 2	William T. Green
Lowell	April 4	Albert H. Brewster
Salem	April 7	Paul W. Hugenberger
Gardner (Worcester subclinic)	April 8	John W. O'Meara
Brockton	April 10	George W. VanGorder
Greenfield	April 14	Charles L. Sturdevant
Springfield	April 15	Garry deN. Hough, Jr.
Pittsfield	April 16	Frank A. Slowick
Worcester	April 18	John W. O'Meara
Hyannis	April 24	Paul L. Norton
Fall River	April 28	David S. Grice

Physicians referring new patients to clinics should get in touch with the district health officer to make appointments.

BOOKS RECEIVED

The receipt of the following books is acknowledged, and this listing must be regarded as a sufficient return for the courtesy of the sender. Books that appear to be of particular interest will be reviewed as space permits. Additional information in regard to all listed books will be gladly furnished on request.

Chemistry of Anesthesia. By John Adriani, M.D., director, Department of Anesthesia, Charity Hospital of Louisiana at New Orleans, and clinical professor of surgery, Louisiana State University of Medicine. 8°, cloth, 535 pp., with 45 illustrations. Springfield, Illinois: Charles C Thomas, 1946. $7.00.

Diagnostic Examination of the Eye: Step-by-step procedure. By Conrad Berens, M.D., professor of clinical ophthalmology, Columbia University, executive eye surgeon, New York Eye and Ear Infirmary, and managing director, The Ophthalmological Foundation; and Joshua Zuckerman, M.D., C.M., instructor in ophthalmology, New York Eye and Ear Infirmary and Columbia Postgraduate School, ophthalmic surgeon, Midtown Hospital, and assistant ophthalmic surgeon, New York Eye and Ear Infirmary. 8°, cloth, 711 pp., with 410 illustrations. Philadelphia: J. B. Lippincott Company, 1946. $15.00.

It's How You Take It. By G. Colket Caner, M.D., associate in neurology, Massachusetts General Hospital, and psychiatrist in the Department of Hygiene, Harvard University. 12°, cloth, 152 pp. New York: Coward-McCann, Incorporated, 1946. $2.00.

Diseases of the Retina. By Herman Elwyn, M.D., senior assistant surgeon, New York Eye and Ear Infirmary. 8°, cloth, 587 pp., with 170 illustrations. Philadelphia: Blakiston Company, 1946. $10.00.

Roentgen Diagnosis of Diseases of the Gastrointestinal Tract. By John T. Farrell, Jr., M.D., clinical professor of radiology, Graduate School of Medicine, University of Pennsylvania, radiologist, Hermann Hessenbruch Memorial Department of Radiology, Lankenau Hospital, radiologist, Children's Hospital of the Mary J. Drexel Home, roentgenologist, White Haven Sanatorium, consulting roentgenologist, Frederick Douglass Memorial Hospital, and consulting roentgenologist, Mercy Hospital. 8°, cloth, 271 pp., with 190 illustrations. Springfield, Illinois: Charles C Thomas, 1946. $5.50.

Sex Problems of the Returned Veteran. By Howard Kitching, M.D. With a foreword by Ernest R. Groves, professor of sociology, University of North Carolina. 12°, cloth, 124 pp. New York: Emerson Books, Incorporated, 1946. $1.50.

Music in Medicine. By Sidney Licht, M.D. 8°, cloth, 132 pp. Boston: New England Conservatory of Music, 1946. $3.00.

Agnosia, Apraxia, Aphasia: Their value in cerebral localization. By J. M. Nielsen, M.D., associate clinical professor of medicine (neurology), University of Southern California, and senior attending physician in neurology and assistant in neuropathology, Los Angeles County Hospital. Second edition, completely revised. 8°, cloth, 292 pp., with 59 illustrations. New York: Paul B. Hoeber, Incorporated, 1946. $5.00.

Human Embryology. By Bradley M. Patten, M.A., Ph.D., professor of anatomy, University of Michigan Medical School. 8°, cloth, 776 pp., with 446 illustrations. Philadelphia: Blakiston Company, 1946. $7.00.

Hippocratic Wisdom: For him who wishes to pursue properly the science of medicine: A modern appreciation of ancient scientific achievement. By William F. Petersen, M.D., Chicago. 8°, cloth, 263 pp. Springfield, Illinois: Charles C Thomas, 1946. $5.00.

Clinical Roentgenology of the Heart. By John B. Schwedel, M.D., associate attending physician, Medical Division, and adjunct attending physician, Department of Roentgenology, Montefiore Hospital, New York City, and attending electrocardiographer and associate visiting physician in medicine, Gouverneur Hospital, New York City. *Annals of Roentgenology*, Vol. XVIII. 749 illustrations. New York: Paul B. Hoeber, Incorporated, 1946. $12.00.

Diseases of the Adrenals. By Louis J. Soffer, M.D., adjunct attending physician, Mount Sinai Hospital, New York City. 8°, cloth, 304 pp., with 42 illustrations and 2 colored plates. Philadelphia: Lea and Febiger, 1946. $5.50.

Ophthalmology in the War Years. Edited by Meyer Wiener, M.D., professor of clinical ophthalmology, Washington University School of Medicine. Volume I (1940–1943). 8°, cloth, 1166 pp. Chicago: Year Book Publishers, Incorporated, 1946. $13.50.

NOTICES

SUFFOLK CENSORS' MEETING

The Censors of the Suffolk District Medical Society will meet for the examination of candidates at the Boston Medical Library, 8 Fenway, on Thursday, May 1, at 4:00 p.m.

NEW ENGLAND OBSTETRICAL AND GYNECOLOGICAL SOCIETY

The spring meeting of the New England Obstetrical and Gynecological Society will be held in Providence on Wednesday, April 30. Clinics will be held at the Rhode Island Hospital and the Providence Lying-in Hospital. Dinner will be served at the Squantum Club.

(*Notices continued on page xxiii*)

NOTICES (*continued from page 492*)

NEW ENGLAND DIABETES ASSOCIATION

The first meeting of the New England Diabetes Association will be held on Wednesday, April 16, at 7:30 p.m., in the Dowling Amphitheater, Boston City Hospital.

PROGRAM

Diabetes and Hyperthyroidism. Drs. Frank N. Allan and Rosemary Murphy.

The Relation between Insulin Sensitivity and Insulin Resistance. Dr. Francis C. Lowell.

Diabetic Coma at the Boston City Hospital. Dr. W. R. Ohler.

Renal Disease in Diabetes. Dr. Stanley Robbins.

A brief business meeting for the purpose of electing officers and directors and adopting a constitution will follow.

Physicians, surgeons, nurses, dietitians and other scientific workers interested in the problems of diabetes may apply for membership at the meeting or may write for application blanks to the temporary secretary, Dr. James H. Townsend, 330 Mt. Auburn Street, Cambridge.

NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

The monthly clinical conference and meeting of the staff of the New England Hospital for Women and Children will be held on Thursday, April 3, at 7:15 p.m., in the classroom of the Nurses' Residence. Dr. Johannes Groen, chief, Second Medical Service, Queen Wilhelmina Hospital, Amsterdam, Holland, will speak on the subject "Medical Observations in Holland during the German Occupation." Dr. Z. Eileen Taylor will be chairman.

NEW ENGLAND DERMATOLOGICAL SOCIETY

The annual meeting of the New England Dermatological Society will be held in the Skin Out-Patient Department of the Boston City Hospital on Wednesday, April 9, at 2:00 p.m.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING THURSDAY, APRIL 3

THURSDAY, APRIL 3
7:15 p.m. Monthly Clinical Conference and Meeting of the Staff. Classroom, Nurses Residence, New England Hospital for Women and Children.

FRIDAY, APRIL 4
*10:00 a.m.–12:00 m. Medical Staff Rounds. Peter Bent Brigham Hospital.

MONDAY, APRIL 7
*12:15–1:15 p.m. Clinicopathological Conference. Peter Bent Brigham Hospital.

TUESDAY, APRIL 8
*12:15–1:15 p.m. Clinicoroentgenological Conference. Peter Bent Brigham Hospital.
8:00 p.m. Harvard Medical Society. Amphitheater, Peter Bent Brigham Hospital.

WEDNESDAY, APRIL 9
*11:00 a.m.–12:00 m. Medical Clinic. Amphitheater, Children's Hospital.
*12:00 m. Clinicopathological Conference. (Children's Hospital.) Amphitheater, Peter Bent Brigham Hospital.
2:00 p.m. New England Dermatological Society, Skin Out-Patient Department, Boston City Hospital.
*2:00–3:00 p.m. Combined Clinic by the Medical, Surgical and Orthopedic Services. Amphitheater, Children's Hospital.

*Open to the medical profession.

MARCH 31. New England Heart Association. Page 455, issue of March 20.
APRIL 1. Greater Boston Medical Society. Page 456, issue of March 20.
APRIL 3. New England Hospital for Women and Children. Notice above.
APRIL 8. Boston City Hospital House Officers' Association. Page 456, issue of March 20.
APRIL 9. New England Dermatological Society. Notice above.
APRIL 10. Physiotherapy: Its practical application and its limitations. Dr. Franklin P. Lowry, Pentucket Association of Physicians. 8:30 p.m. Haverhill.
APRIL 15–18. Postgraduate Institute. Page 382, issue of March 6.
APRIL 16. New England Diabetes Association. Notice above.

DISTRICT MEDICAL SOCIETIES

PLYMOUTH
APRIL 17 State Farm, Bridgewater.
MAY 15. Lakeville Sanatorium, Lakeville.

SUFFOLK
MAY 1. Censors' meeting.

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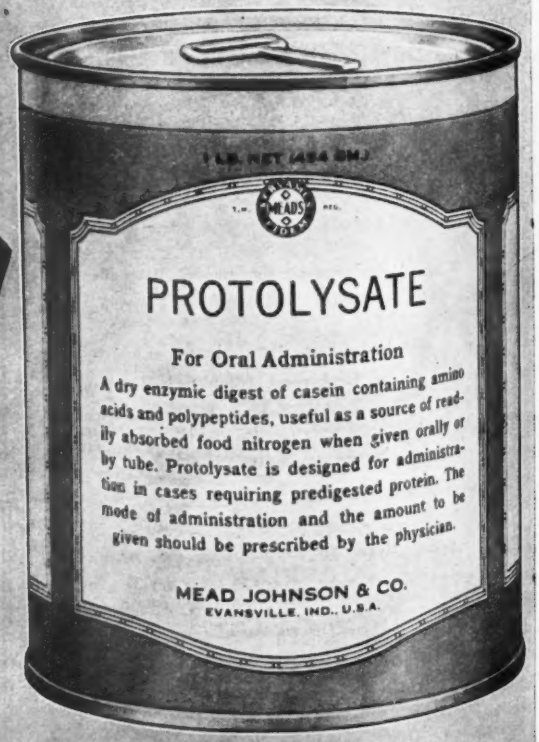
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